Volume Five

Siris

Three Letters to Thomas Prior

A Letter to Dr Hales

Farther Thoughts on Tar-water

Varia

Bibliotheca Britannica Philosophica

The Works of George Berkeley Bishop of Cloyne

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5

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Edited by
A A Luce and T E Jessop

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Edited by

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EDITOR'S PREFACE

On Tar-water

Berkeley's earliest mention of tar-water is in a letter of 8 Feb. 1741 to Thomas Prior: he says first that he has successfully used 'a heaped spoonful of rosin powdered fine in a little broth' for dysentery, and then that he is inquiring into the medicinal possibilities of tar-water. A year later he recommends it to another friend (Gervais), apparently as a tonic. It is a fair inference from Sect. 2 of *Siris*, and from his letter of 3 Dec. 1744 to Linden, that he first learned of the medicinal use of tar-water—as a preventive of smallpox—while he was in America (1728–31). In the letter to Linden he adds that this use, so far as he knew, was confined to Carolina, and that he is not sure whether it originated with the Europeans or with the natives. Linden himself, a German physician resident in England, confirms this connexion with America,[1] and the connexion with Carolina in particular is supported in a contemporary periodical.[2]

What drove Berkeley into the field of medicine was perhaps partly his own growing invalidity,[3] but certainly and chiefly the

[1] 'A tar-tea has been known for some years among sailors in England who are engaged in the trade with the West Indies. They make it in the following way. They take old ship's ropes, which, having been tarred often, retain much of their tar, and cut or hack them into small pieces, put these into a tea-pot, pour in boiling water, let it stand for a while, and drink the infusion warm like any other tea. They say that it is good for asthma and other chest complaints to which these seagoing folk are liable. How they came to use this remedy I have not yet been able to find out'—but he notes that it was familiar only to sailors whose voyages took them to Virginia (*Gründliche historische Nachricht vom Theer-Wasser*, 1745, Amst. and Lpzg., p. 118).

[2] *Gentleman's Magazine* (London), vol. ix (Jan. 1739), p. 36. This gives directions for making tar-water and prescribes it for smallpox and consumption of the lungs. 'By this remedy several persons in Charles Town, South Carolina, where the small pox was lately very mortal, escaped the infection.' The review of *Siris* in vol. xiv (1744), p. 193, refers back to this note.

[3] In *Siris*, Sect. 119, he refers to an 'old and rooted illness,' a nervous colic; cp. Sect. 125, 'if I enjoyed better health.' In a letter of 7 June 1741 to Sir John James he goes so far as to say: 'The years I have lived, the pains I have taken, the distempers I labour under, make me suspect I have not long to live.'

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appalling sickness and mortality attending a famine that began in Ireland in 1739. Exceptional in his day for philanthropy—*e.g.* in his disinterested anger over the South Sea Bubble, his Bermuda project, and his *Querist*—and exceptional in his day also as a bishop in his devotion to the *people* of his diocese, he could not bear to give the sick nothing but ghostly comfort. Yet was he not presumptuous in playing the part of a doctor? The question reads into a rural area of two centuries ago the conditions of the urbanized life of to-day. There are two justifying reasons of his action. (*a*) Doctors were so scarce that there was apparently not one resident in the cathedral town of Cloyne itself. 'I live,' he writes in *Siris*, Sect. 72, 'in a remote corner, among poor neighbours, who for want of a regular physician have often recourse to me.'[1] Then, and for long afterwards, it was in the mansions of landlords that common folk sought and found recipes and specifics for their ills; and Berkeley, because a bishop, was also a landlord. (*b*) Doctors were at that time, to speak mildly, neither well selected nor well trained. Clinical experience apart (which yielded far less knowledge than it does now), a mind like Berkeley's could in a short time learn more of medical lore than most of the practitioners could learn in a lifetime, for he could read more, understand more, criticize more, and observe and infer better. In medical principle *Siris* is admirable.[2] What it lacks is the science of a later century. Berkeley has a *tu quoque* for his professional critics: 'If physicians think they have a right to treat of religious matters, I think I have an equal right to treat of medicine' (below, p. 173).

He rates his theory lower than his practice: 'I appeal to time and experiment' (*Siris*, Sect. 82). His success presented facts which 'neither stand nor fall with any theories or speculative principles whatever' (p. 178); and his failures and doubts are candidly recorded. He used tar-water first against smallpox, then against diseases due to or accompanied by foul blood, and went on extending its application, at every stage encouraged by the results. In claiming that it was probably a panacea (p. 175) he belonged to his age: in his time even physicians of standing

[1] Similarly in the letter to James quoted in the preceding note: 'My family having many ill of an epidemical fever that rages in these parts, and I being the only physician to them and my poor neighbours. . . .'

[2] *E.g.* the organism is to be assisted, not violently interfered with (Sect. 114); and a natural substance is more likely to be helpful than an artificial one ('the chemistry of Nature is much more perfect than that of human art' Sect. 29). In both these principles he was following Boerhaave.

had their 'catholicons,' and there was very little science against them, and the old alchemistic faith behind them. His zeal was quickened by his finding it to be a prophylactic as well as a cure. Acutely aware in himself that the finite mind is tied to a body and changes concomitantly with this—by divine providence, he had always said in his philosophy—he would have the body sound for the sake of the mind; as he says in his Introduction to *Siris*, 'If the lute be not well tuned, the musician fails of his harmony.' He further claimed for tar-water three practical advantages over other remedies. First, it was very cheap, within the reach of the poorest, 'a medicine for the common people' (p. 215). He regrets that 'the folly of man rateth things by their scarceness' (*Siris*, Sect. 22). Secondly, it required no disturbing regimen, 'layeth under no restraint either as to diet, hours, or employment' (Sect. 64). Thirdly, it could be given safely to infants, 'which cannot bear the common treatment and methods of physic' (p. 209). For his special way of preparing a tar-medicine he claims two merits: by making an infusion with cold water instead of distilling with heat, the efficacious 'acid' retains its vehicle of volatile oil, so smoothing its action in the human body; and by allowing the infusion to stand until the crude oil rises as a removable scum, a nauseating stuff is made potable.

Compared with the current medicines, tar-water was at least fairly safe. Subsequent science has not altogether swept it away. Eventually it received official recognition, and is still used under the name *pix liquida* (one part of wood-tar mixed in four parts of water and then filtered—as prescribed by Berkeley). Containing such aromatic substances as guaiacol, creosol and pyratechol, it disinfects the gastro-intestinal tract, though in large quantities the acetic acid in it is said to disturb digestion. Its external use, also recommended by Berkeley, is still recognized for such scaly diseases of the skin as chronic eczema. A medical Fellow of Trinity College, Dublin, recently took the trouble to examine the cures reported in Thomas Prior's *Authentic Narrative of the Success of Tar-water* (1746), and concluded that 'the greater number consist of chronic coughs and chest-diseases, in which this remedy would undoubtedly give relief. These therapeutic properties are, however, too limited to account for more than a small proportion of the diseases given by Berkeley and Prior.' [1]

[1] J. Bell, *Irish Journal of Medical Science*, Dec. 1933. The *Acta Eruditorum* (Aug. 1746, pp. 466–9) concludes its review of the early French

The response to Berkeley's publication of his remedy was instant and sensational. The drinking of tar-water became a vogue. The collection and publication of cures was undertaken by his friend Prior. The *Dublin Journal* began its printing of reports in March 1744, and the *Gentleman's Magazine* in June. By June there was a 'Tar-water Warehouse' in St. James's Street, London. In May Horace Walpole was able to make a little good-humoured fun of it:[1] 'We are now mad about the water, on the publication of a book by Dr. Berkeley, Bishop of Cloyne. The book contains every subject from tar-water to the Trinity; however, all the women read it, and understand it no more than if it were intelligible. A man came into an apothecary's shop the other day. "Do you sell tar-water?" "Tar-water!" replied the apothecary, "Why, I sell nothing else."' Much the same was said in June by Herring, Archbishop of York, also writing from London:[2] 'It is impossible to write a letter now without tincturing the ink with tar-water. This is the common topic of discourse both among the rich and poor, high and low; and the Bishop of Cloyne has made it as fashionable as going to Vauxhall or Ranelagh.' In July Adam Smith, then a student, wrote to his mother from Oxford:[3] 'Tar-water is a remedy very much in vogue here at present for almost all diseases. It has perfectly cured me of an inveterate scurvy and shaking in the head.' In 1747 Princess Caroline was taking it.[4] The fame spread abroad, as is shown by the early translations of the sections of *Siris* dealing with tar-water. Already in 1745 tar-water was advertised in Göttingen. The vogue soon passed, but the remedy remained, in various guises; for example, a pamphlet which seems to belong to about 1840 advertises 'Dr. Berkeley's aromatic tar-pills.' Tar-water was tried in Bishop Butler's last illness. Fielding tells us that he had relief from it. The most impressive witness is Berkeley himself: 'Under Providence, I owe my life to it' (Sect. 119).

The doctors and drug-sellers reacted vigorously. In the letter quoted above, Herring further relates: 'The Faculty in

version of part of *Siris* with the judgment: 'Cum ea quae Autor de hoc medicamento proposuit probabilitate sua non destituantur, ulterioribus observationibus et experimentis accuratior virium descriptarum disquisitio relinquenda est.'

[1] Letter of 29 May 1744 to Sir Horace Mann. [2] *Letters of Thomas Herring to William Duncombe* (1777, Lond.), p. 70. [3] Lord Brougham, *Lives of Philosophers* (4th edn., 1862), p. 280. [4] Berkeley's letter of 14 March to Lord Egmont.

general, and the whole posse of apothecaries, are very angry both with the author and the book—which makes many people suspect it is a good thing.' We have a contemporary story of the attack, told by the German physician Linden.[1] The doctors, he writes, began by averring that tar-water inflames the blood (cp. *Siris*, Sect. 7 and note); but 'here in London the doctors are well paid, usually half-a-guinea a visit.' The pharmacists said the same; and in London 'there are a frightful (*erschrecklich*) number of pharmacists.' The attack was pressed not only in journals but also 'in special broadsheets, scattered all over London by a lot of wretches.' Street-criers were hired, and the common quacks of the street and market-place made use of. The note was then changed from vilification to warning: tar-water might be good in certain cases, but only under expert supervision. Then ridicule was tried: for example, it was proposed that politicians should be 'balsamed' against corruption, and one pamphlet represented the shade of Berkeley talking on the banks of the Styx with other fools who in this life and this island had recently sponsored panaceas.[2] But all this was without avail, both Society and the people seeing only a vested interest defending itself.[3] The vogue was strengthened instead of weakened, and the glassfuls of tar-water, put together, would soon have made a river or a sea. Berkeley himself abstained from the controversy, apart from the bantering verses printed in this volume; for the *Letters*, also in this volume, are much more positive expositions than answers to attacks. In 1747 he was able to say that the successes of his remedy 'have recommended it to the general esteem of the world' (below, p. 196); and in 1752 that 'in both North and South, in West and East Indies, it hath been used and continues to be used with great success. It hath reached all our colonies both on the Continent and the Islands, and many barrels of tar-water have been sent from Amsterdam to Batavia' (p. 216).

[1] *Gründliche historische Nachricht*, ch. 4, and cp. below, p. 225.

[2] For a list of some of the contemporary pamphlets see *A Bibliography of Berkeley*, by Jessop and Luce (1934, Oxford), pp. 49–51.

[3] Linden (*op. cit.*, p. 98) pays a great compliment to the people: 'To the credit of the English masses it must be said that they have a sense of justice, wanting every man to have his due, and—this being the most remarkable—in seeing to that they first inquire after the real causes, think over them, convinced willy-nilly of the innocence of the injured party, and never rush on blindly, as the masses usually do in other countries.'

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Siris:

A Chain of Philosophical Reflexions and Inquiries

Concerning the Virtues of Tar-water, and divers other Subjects connected together and arising One from Another

As we have opportunity, let us
do good unto all men.
Gal., vi. 10

Hoc opus, hoc studium, parvi properemus et ampli.
Hor. [*Epist.*, I. iii, 28.—Ed.]

First printed in 1744

EDITOR'S INTRODUCTION

Bibliographical

This work, written in Cloyne, is Berkeley's latest major composition. It appeared early in 1744. Six editions bear the imprint of this year, two from Dublin and four from London. In what order they appeared—indeed, which is the first and which the last—I can neither discover nor with certainty infer. Since for displaying the results of collation an order is required, I have adopted the following (the letter-symbols are those used in the *apparatus criticus*):

A. *Siris: A Chain of Philosophical Reflexions.* By 'G.L.B.O.C.' (*i.e.* George, Lord Bishop of Cloyne). Dublin, pp. 261.

B. (i) *Philosophical Reflexions.* By Berkeley. London, pp. 176.
(ii) *A Chain of Philosophical Reflexions.* By Berkeley. London, pp. 176.

These two differ only in the title-page, the rest being from the same set-up of type. The longer title appears in both at the beginning of the text (p. 3). Both differ from A only in a very few instances.

C. *Siris*, etc. By Berkeley. 'Second edition, improved and corrected by the author.' 'Dublin printed, London reprinted.' Pp. 174.

Introduces a number of changes that are also in D and E, and some peculiar to C and D. Adds Table of Contents.

D. *Siris*, etc. By Berkeley. 'New edition, with additions and emendations.' 'Dublin pr., London repr.' Pp. 174.

From the same set-up of type as C, with small changes at only a few points, and additions to Table of Contents.

E. *Siris*, etc. By 'G.L.B.O.C.' 'Second edition, improved and corrected by the author.' Dublin. Pp. 150.

Not the same as C. Has many readings peculiar to itself. There were three issues—(i) ending FINIS; (ii) ending FIFIS; (iii) ending FIFIS and including Verses on Tar—but the text seems to be identical in all. I have collated from a copy of the first in the Library of Cambridge University.

It is certain that either A or B is the first edition. They were announced at almost the same time, the former in the *Dublin Journal* of 20 March, the latter in the *Gentleman's Magazine* (London) of April. The shorter title of B suggests that it was the earlier. That A was the earlier is suggested by four considerations—(*a*) the author is represented by initials only; (*b*) C and D bear the imprint 'Dublin pr., London repr.,' which, however, on my supposition, ought also to have been in B; (*c*) Berkeley, being long settled in Ireland, would be able to deal more expeditiously with the Dublin publisher; (*d*) the readings in the *addenda* of A are in the text of B. The evidence is neither way decisive, but I lean to the priority of A. Since the texts of A and B are virtually identical, there is nothing exegetical at stake.

The only other edition that can be dated by external evidence is E, which was announced in the *Dublin Journal* of 1 September. The crucial bibliographical question (again without exegetical importance, except in Sect. 1) is whether this appeared earlier or later than C and D. That it appeared later seems to me to be extremely probable, for the following reasons—(*a*) it contains the largest number of alterations; (*b*) many of these are, in substance or form, of the kind that would be made later; (*c*) in a letter of 3 Dec. 1744 to Linden, who had intimated his intention to translate parts of *Siris* into German, Berkeley recommends him to use E as the most accurate edition, and sends him a copy of it. There is also the general probability that several London editions would be sold out before a single Dublin edition. On the other hand, it is possible that C and D were published after 3 Dec., for in the Old Style the year did not end until March. Assuming so, we have to ask why their texts stand closer to A and B than to E. A puzzle remains anyhow, for the only other edition that appeared in Berkeley's lifetime (1747, 'New ed., with additions and emendations,' 'Dublin pr., London repr.,' pp. 174) is from the same set-up of type as C and D, with a small addition to Sect. 61. The puzzle would be removed if we could suppose that the London editions were pirated, but the changes made in C have clearly been made by the author.

My own conclusion, from internal evidence, is that E was not only later than C and D but was the last of all the editions that passed through Berkeley's own revising hands; in other words, that its *text* is later than that of 1747. In Sect. 1, for example, the directions for making tar-water in the 1747 edition

follow the early A and B, while the changes made in E agree with the later directions given in the first *Letter to Prior* (Sect. 2); and the footnote peculiar to E (Sect. 1) is an explicit avowal of further experience. I would therefore like to have printed the text of E. But since the conclusion is not certain, I have followed the convention of printing from the latest edition (1747, with the spelling and punctuation modernized), indicating all variants in the five preceding texts.

After 1747 there was no further separate edition. The piece has been included in all the editions of Berkeley's collected works. Parts of it were translated into Dutch, French and German in 1745, and into Spanish in 1786. As a whole it has been translated only into German (1914) and French (1920). The immediate interest abroad, as here, was in the sections on tar-water, the scientific and philosophical sections passing unheeded.

Title, Theme, and Interest

The title *Siris* is Greek, the diminutive of *seira*, a cord or chain (Berkeley notes, p. 185, the coincidence that *Siris* was also the old Egyptian name of the Nile). He chose it as expressing both the form of his work and that general aspect of the world which the work alleges.

The form is unfolded in the words that follow *Siris*: 'A chain of philosophical reflexions and inquiries concerning . . . subjects connected together and arising one from another.' This means that the book is not a treatise, cleansed and shaped to present a theory in demonstration, but an extended meditation, straying into bypaths, turning corners with surprise views, and moving onwards without a clear prevision of the way. Berkeley asks pardon 'if this rude essay doth, by insensible transitions, draw the reader into remote inquiries and speculations that were not thought of either by him or by the author at first setting out' (Sect. 297). From this we learn the right mode of approach. No one is obliged to read the book, but any one who does is obliged to judge it by the canons appropriate to its form—as a series of ruminations, not to be carped at for gaps or disproportion, and not to be quoted from for strict doctrine without sympathetic care. Not that it is shapeless, as the analysis appended to this Introduction will make evident. *Siris* is the work of an ageing but singularly ripe mind, which cannot far escape from a lifelong habit of ordered and evidenced thinking. Berkeley's digressions

are short; he turns quickly from authority to experience or experiment, knowing the limits of each; if he lets slip a dogma, he adds an apology or a warning; and when, towards the end, he keeps company with the sages of antiquity, he does so with a sense of their inadequacy and his own. The theory that guides the ruminations is that 'there runs a chain throughout the whole system of beings' (Sect. 303; cp. 274, 284).[1] The figure is Neoplatonic (much used by Proclus in particular), and the book ends with a Neoplatonizing vision. Another figure that occurs is 'scale' (Sect. 274) or 'climax' (Sect. 296). That the world is one system, 'a mutual connexion and correspondence of parts' (*Alciphron*, 1, 16), had long been a commonplace: Berkeley's version of it is that physical Nature is unified by aetherial Fire, and the entire universe of body and spirit by God. Between 'the two extremes of what is grossly sensible and purely intelligible' (Sect. 296) we mount from bodies to the moving life and from this to the controlling and originating Mind, from ultimate effect in human apprehension to the ultimate cause in God, from our beholding of light and heat through the kindled or vivified body to the kindling and vivifying Fire, itself but a passive instrument that sends thought upward to the divine director and deviser; in which vast chain 'the first and last links are allowed to be incorporeal' (Sect. 220). At the end of his philosophical career, as at the beginning, Berkeley exclaims that the corporeal world is created not only as a reliable territory for our action but also in order to be beheld, and to raise the beholding mind to the Creator. He remains a mouthpiece of the tradition voiced by Bacon: 'In the entrance of philosophy, when the second causes, which are next unto the senses, do offer themselves to the mind of man, if it dwell and stay there it may induce some oblivion of the highest cause; but when a man passeth on farther, and seeth the dependence of causes, and the works of Providence, then, according to the allegory of the poets, he will easily believe that the highest link of Nature's chain must needs be tied to the foot of Jupiter's chair.'[2]

The lowest link could have been anything in the sensible world, but at the time of writing Berkeley was thinking much of vegetable tar, and it is from this that he follows the chain to the Trinity—starting with empiric medicine, seeking a theory for it

[1] There is also a hain of faculties in the finite mind, passing from sense through imagination and discursive reason to intellect (Sects. 275, 296, 303).

[2] *Of the Advancement of Learning*, BK. 1

in vegetable and animal physiology old and new, finding the physical secret in Aether as the quickening force in all things, and finally quitting science for venerable metaphysics, where he all but blends his own original philosophy with the theosophical theories of ancient Greece and the yet more ancient Middle East.

To make the mental journey with him is to leave the screeching of this bustling age, and to enjoy the effortless movement of one of our rarest minds gently expanding its practised powers, carrying strange learning lightly, oscillating with ease between minute observations of natural history and the large visions of cosmology and theology, rising and falling freely through the several dimensions of reality and thought, and—such was the charm of this voyaging mind—insufflating the narrative of it all with a breath as aromatic as the balsams with which it began. This is not an eccentric appreciation. George Saintsbury, no narrow pedant, after avowing that Berkeley's *Alciphron* 'may be read again and again with positive pleasure,' adds, 'as for *Siris*, I wish I knew of a pocket edition of it.' [1] Among earlier men of letters, Fielding had read it, so also had Coleridge and De Quincey, and Blake's copy of *Siris* survives with notes written in the margins.[2] It doubtless appealed to them as a protest against the so-called Age of Reason; and, certainly, A. N. Whitehead shows insight in placing Berkeley alongside the leaders of the romantic reaction, as 'representative of the intuitive refusal to accept the abstract materialism of science.' [3] Those romantics would be quick to savour *Siris* as literature in both its mood and its verbal texture. Within a few weeks of its first appearance someone had written of it: 'You know how wild ingenious enthusiasts are; but the book deserves to be read for the elegance of its style, a thing rarely met with in this age of bombast.' [4] Under Berkeley's hand metaphysics assumes a quiet beauty, and even stale science puts on habiliments of grace. When the matter is dull, a phrase lights it up: everything becomes wax to be made a candle of. When Berkeley endows the physical world with an 'animal spirit' we may nod, proud of our later science; but our science and vanity vanish when we come upon the sentence, 'It is this

[1] *Peace of the Augustans*, ch. 6.

[2] In 1938 the copy was in the possession of Lord Rothschild. The notes are printed in *Poetry and Prose of Blake*, ed. G. Keynes (1927), pp. 1021–3.

[3] *Science and the Modern World*, 1928 p. 106.

[4] C. Pratt, letter of 29 April 1744, in *Illustrations of the Literary History of the 18th Century*, ed. J. Nichols, 1817, VOL. I, p. 645.

gives instincts, teaches the spider her web and the bee her honey' (Sect. 277). His catalogue of the diseased may bore us, until he comes to them that live delicately, who are under the 'gloomy empire of the spleen' (Sect. 106) and, 'as if their skin was peeled off, feel to the quick everything that touches them' (Sect. 105); and to the unhungry ladies of society 'sitting pale, puny, and forbidden like ghosts, at their own table' (Sect. 118). A mention of the poor copying the rich in spirit-drinking is riveted with the remark, 'A nation lighted up at both ends must soon be consumed' (Sect. 108). And there is the famous sentence at the end, famous for its perpetual rightness as well as its being well said, 'Truth is the cry of all, but the game of a few.'

Old Science

To read Berkeley's scientific sections is humiliating, for here one of our ablest and most learned minds is writing things which the most mediocre student of to-day knows to be wrong. Many of them were sensible enough when they were written. Right conclusions depend, however, as much on right data as on right thinking, and of the former there was still a scarcity in Berkeley's day. Of the latter he had no lack. In all his writings he shows a nice sense of scientific evidence. Even in *Siris*, where he relies much on authorities, it is their observations that he accepts, perforce, being cloistered in Cloyne; his principles, even when borrowed, have been personally inspected, and his inferences, qualified with scrupulous asides, are usually his own. But the limitations under which he laboured have to be remembered. In the first place, natural science was for him a parergon, neither his calling nor his ruling interest, but simply one of the fields into which an academic divine of that day could naturally move. Secondly, at the time of writing he was locked away—and had been for some ten years—in a small town, far from contact with living practitioners of science,[1] and was therefore dependent on his private library. How comprehensive this was is shown by the range of his references, which include new text-books, standard treatises, the *Philosophical Transactions* of the Royal Society, and the *Acta eruditorum* of Leipzig, cheek by jowl with the *Chaldaean Oracles* and the *Hermetica*. Thirdly, of the basic natural sciences, only physics was out of its earliest infancy, so that in chemistry

[1] 'Those opportunities of a learned commerce from which I am cut off in this remote corner' (Sect. 125).

and botany, as in medicine, he was backward only because his contemporaries were.

He takes us first into botany, for the tar which starts his thinking comes from a living plant, not, like our later coal-tar, from a fossilized one: it is got from 'the last product of a tree, perfectly maturated by time and sun' (Sect. 38). For botany as natural history he had read Theophrastus and the elder Pliny as a matter of course, and among the moderns the folios of Evelyn and Ray. Vegetable anatomy and physiology had had to wait for the development of the microscope, and its fairly recent first-fruits lay before him in the work of Malpighi and Grew, which he notes with obvious interest. The similarities of structure and function between plants and animals (Sects. 29ff.) were just coming to be known, and the exaggerations natural in the first flush of discovery are traceable here and there in *Siris*.

He spends more time on chemistry, to track down the constituent that makes tar curative, and to justify its use by simple solution in cold water as against its being subjected to distillation. In this part we have to bear in mind that in 1744 Priestley was only a lad of eleven, Lavoisier a one-year-old, and Dalton unborn. Alchemy still largely held the field, for the most part in the form given to it by Paracelsus, as iatrochemistry, that is, chemical inquiry in the service not of the metallic arts but of medicine (there were iatrophysicists as well, *e.g.* Borelli, regarding the living body mechanistically). This was a reaction against the long dominance of Galen with his 'humours.' Paracelsus's pupil, Van Helmont, whom Berkeley mentions, retained the alchemists' theory of three 'elements,' called sulphur, mercury and salt, but meaning respectively the combustible, liquid and solid factors in all substances. This theory, although challenged by Boyle, who defined 'element' in the modern way, persisted into and after Berkeley's time. Nevertheless, one portentous discovery had been made: air, held from Paracelsus onwards to be a mixture, was found in the latter half of the seventeenth century to include among its gases one that is necessary both to combustion and to life. Berkeley, writing a generation before Priestley, was easily able to identify it with his Aether. He made such use as he could of the fumbling investigations of the time, like most of his contemporaries taking his knowledge of chemistry chiefly from Boerhaave's *Elementa chemiae* (1724). His terms were contemporary, and must be read accordingly: for instance, when he speaks of 'spirits' he means only 'forces' (*vires*), just

as in plant and animal physiology he means by 'soul' no more than the principle of life (*anima*). He thought of chemical processes in corporeal terms, and in physiology he was a vitalist in the minimal sense. He expressly and emphatically says that the *anima mundi* is corporeal. The only minds for him are the human and angelic, and God.

In medicine, the chemical school prevailed over the physical. Its early leader, Sylvius of Leyden (1614–72), had promulgated, with some anticipation by Van Helmont, the doctrine that health consists in a balance of the acid and the alkaline juices. Berkeley clearly inclines to this view (*e.g.* Sects. 92 and 124), which had the powerful authority of Boerhaave also behind it, and mentions the distinguished anatomist who promoted that view in England, Thomas Willis, the chief of our iatrochemists, working still with the three alchemistic 'elements.' Willis's contemporary, the renowned Sydenham, inevitably appears in *Siris*, and perhaps it was from him that Berkeley derived his respect for Hippocrates, and his tendency to see in the symptoms of disease the body's effort to regain health by throwing out the morbific matter; but he disagreed with Sydenham's strong advocacy of bleeding (cp. Sects. 78 and 218). Berkeley naturally draws also on Boerhaave (an admirer of Sydenham and of Hippocrates), whose distinctive work lay in his seeing and meeting the requirement that all the new scientific knowledge—physical, chemical, botanical and zoological—should be gathered and sifted for its bearings on medicine. The mention of other physicians, Continental and English, shows that Berkeley tried to keep abreast of both the practice and the theory of the healing art. His pages reflect the groping stages of both.

On these foundations he builds a cosmology, which he clearly treats as falling on the side of science, not of metaphysics, for, though speculative, it deals with the corporeal instruments of causal power, not with causal power itself, which on his view resides only in mind. It is a cosmology that gives the supreme place within Nature to an aetherial Fire. About this cosmology two curious facts have to be noted. The first is that Berkeley had given a summary exposition of it twelve years earlier, in *Alciphron* (VI, 14), but only to satirize it, putting it into the mouth of the most irresponsible of his characters. The second is that in his first *Letter to Prior* (below, p. 176) he says that he had 'a long time entertained an opinion . . . that Fire may be regarded as the animal spirit [*i.e.* animating factor] of this visible world.'

Why did he dismiss the theory in 1732, and embrace it not long afterwards? And where did he get it from?

To the second question Berkeley himself helps us towards the answer. The passage in *Alciphron* refers the theory to a 'great man . . . who has made many processes upon vegetables.' None of the leading English botanists suits the rest of the passage. The man who does is the botanist, chemist and physician Hermann Boerhaave, of Leyden, who was elected into our Royal Society in 1730. He was counted great throughout Europe (the report has come down of a letter addressed by a Chinese mandarin 'To M. Boerhaave, physician in Europe' and duly delivered). His *Elementa chemiae* contains many of the ideas which Berkeley has pulled together in his scientific sections. In Appendix II, I have collected some passages from it in order to illustrate the probable debt (the whole work runs into 1434 quarto pages). An examination of Boerhaave's medical writings (one of them is referred to in Sect. 83) would doubtless reveal further influence. In *Siris*, Sects. 189f., Berkeley mentions Homberg, Boerhaave, Nieuwentijdt, 'and divers other moderns,' as having assigned a peculiar dignity to an elemental fire; but Homberg is immediately criticized, and Nieuwentijdt's *Religious Philosopher* (see my note on Sect. 190) does little more than assert the existence of such a fire. One source may have been the Fire-philosophy of the Stoics as expounded by Cicero in *De natura deorum* (a work which Berkeley certainly used while writing *Siris*): *e.g.* 'Intellegi debet calidum illud atque igneum ita in omni fusum esse natura ut in eo insit procreandi vis et causa gignendi' (II, 10. xxviii).

On the first question we have no help from Berkeley. The context in *Alciphron* is concerned only with the nature of the the human soul, and his rejection there of the fire-theory can be read as being simply a refusal to resolve the soul 'chemically' into fire. It seems to me, however, to be a rejection of the whole theory. If this reading is right, I am driven to make guesses. (*a*) That at first Berkeley knew of Boerhaave's book only through some sketchy review, or in the faulty and unauthorized editions that soon followed the first (1724). Of those Boerhaave complained in the preface to his own 1732 edition, which appeared about six months after the first publication of *Alciphron*. (*b*) That Berkeley acquired a copy of this new edition, and by first-hand study of it came to admire it and to use it as his chief quarry for scientific data and ideas. His attention may have been drawn to it simply by its reputation, or by the serious review of it in the

Acta eruditorum (Leipzig, Sept. 1732, pp. 425–32), or by some other accident, earlier than his interest in tar-water, that turned his mind to what was for him, so far as we know, a new field of study.

Philosophy

Ever since Fraser recalled attention to *Siris*, it has been assumed that this work presents a contradiction, if not a recantation, of Berkeley's earlier philosophical position. The empiricist, we are told, has become a rationalist; the abstractions formerly banished are reinstated as the only realities; the former dismissal of corporeal causes is replaced with a close pursuit of them; and yet other disparities are alleged. The assumption rests on an interpretation both of his early and of his late philosophy with which I am unable to agree. In *Siris* I can see a deep alteration of temper and a larger theatre of interest, but no *volte-face*; an excursion from his older doctrines, not a cancellation of them.[1]

Every general doctrine, and virtually every particular doctrine, of his *Principles* (1710) is reaffirmed in *Siris*. The shortest way of demonstrating this is to group his original affirmations and give references (not exhaustive) to the sections where they recur in the later work:

(*a*) The existence of corporeal qualities or things consists in their being perceived; they are essentially relative to mind, and therefore are entirely and only what they are perceived to be (Sects. 251, 292, 311f.). There can be no abstractions in thought (and nothing corresponding to them in reality) from such qualities or things, except such as are free from sensory and logical impossibility (Sects. 323, 335). Consequently, there can be no absolute (*i.e.* fixed, and independent of all mind) space, motion, magnitudes or figures, and no absolute material system (Sects. 270f., 304). *Minima visibilia* are not mathematical points (Sect. 208), and number is not a datum of sense (Sects. 288, 355).

(*b*) Bodies and minds are radically distinct (Sects. 290, 297). Regarded as objects, the former are denominated 'ideas' and the latter 'notions' (Sect. 308).

(*c*) Body is inactive (Sect. 248). Hence physical science deals not with causal connexions but only with given uniformities (Sects. 231, 293)—hence the value of physics is practical (Sects. 264,

[1] Dr. Luce examined this question in an article, 'The Unity of the Berkeleian Philosophy,' in *Mind*, vol. xlvi (1937), pp. 44–52 and 180–90.

285, 295); what is called force being motion (Sects. 234, 246), motion being a passion not an action (Sect. 250), and attraction being a fact to be explained, not an explaining factor (Sects. 243, 245).

(*d*) The only agents are incorporeal (Sects. 247f.). The order of Nature indicates that it proceeds from a mind (Sects. 154, 173, 231ff., 273). God is not a remote initiating cause of natural events, but their constant cause (Sect. 237), using instruments freely (which finite minds use perforce) as 'necessary to assist, not the governor, but the governed' (Sects. 160; also 261). Nature is a language with which, by the regular connexion of signs and significates, God communicates with us (Sect. 254).

These propositions, taken together, constitute the Berkeleian philosophy, the same at the end as at the beginning. Yet in *Siris* they are accompanied by new statements that sit strangely with them; they are projected into a context so different from their old one that they seem at first sight to lose in it their original meaning and force, and some of them even to be contradicted by it. Does the indubitable difference amount to a grand inconsistency, or at least produce inconsistencies of detail? Apparent differences of doctrine may be considered under three heads:

(1) *Concerning corporeal relations.* Formerly he had insisted unyieldingly that these are never causal; now he speaks of corporeal, even of mechanical, causes. Formerly he had not written about the specific relations among bodies; now he conducts a detailed inquiry into them, passing from the cause of the medicinal virtue of tar-water to the corporeal cause of all corporeal events, and in doing so he admits causes that are occult, which before he had seemed unwilling to entertain. In all which he appears to increase the mediating instruments between our senses and God, and thereby to destroy the immediacy which he had earlier emphasized. In particular, and most surprisingly of all, he now appears to admit the distinction of primary and secondary qualities (Sects. 162, 165, 266, 316).

The reason of all this difference is really very simple. In the *Principles* he had restricted himself to a very few problems of epistemology and ontology; in the sections of *Siris* in which the above new features appear he is playing the part of a scientist. Nothing he had ever written precluded him from this part. He had never dismissed scientific curiosity; indeed, he himself had always had a fair measure of it and had indulged it (see, *e.g.* his

papers on the cave of Dunmore, on earthquakes and on eruptions, and various passages in the journal of his Italian travels). What he had dismissed was the unexamined metaphysical interpretation which scientists commonly fused with their discoveries and inventions. He had always held that there is a *rerum natura*, and that it is the business and privilege of scientists to find this out. Besides, he had had no objection to the use of the term 'cause' for a constant concomitant in the science of body, as a linguistic convenience. In the scientific sections of *Siris* he allows himself this convenience. But he is careful to warn the reader of his usage: 'When we speak of corporeal agents as corporeal causes, this is to be understood in a different, subordinate, and improper sense' (Sect. 154). The same warning occurs when he mentions with some approval the distinction of primary and secondary qualities: the former are 'physical' causes, not real ones. The distinction is one that falls wholly within the province of physics; it stands there so far as a regular concomitance can be empirically established between the two sets of qualities (as he had said in *Principles*, Sect. 65; cp. *De motu*, Sect. 71). It has no more place now than it had originally in his *philosophy*, which is still directed explicitly against mechanism (*e.g.* Sect. 235). Now, as always, he could have made his own the blunt statement of Henry More, 'There is no purely mechanical phenomenon in the whole universe.'[1] It is still not only consistent but obligatory for him to hold that epistemologically a primary quality is not the 'truth' or 'reality' of its connected secondary quality, and that ontologically the former is not an agent, does not produce the latter as a subjective effect within a finite mind. All corporeal qualities alike are on the same existential level as being either actual or possible sense-objects of finite minds, and actual objects and products of God's mind. The science of *Siris* remains within the field of philosophical interpretation marked out in the *Principles*. Thereby the immediacy of God's action is preserved. On Nature He acts and we act—spirits only. Within Nature nothing acts. Berkeley still holds (Sect. 250), as he had argued in *De motu* (Sect. 70), that a moving body is a moved one—not doing anything, but having something done to it.

(2) *Concerning the value of sensation.* The veracity of sense was one of the chief themes of his earlier writings, being his answer to the current form of scepticism. Now, however, he roundly

[1] *Divine Dialogues* (1668), p. x.

asserts, 'Strictly, the sense knows nothing' (Sect. 253), and 'Intellect and reason are alone the sure guides to truth' (Sect. 264); and he repeatedly disparages the things of sense (*e.g.* Sects. 294, 301, 330, 339). He blames the Cartesians for regarding 'sensation as a mode of thinking' (Sect. 266). On the basis of such passages it has been said that Berkeley has passed from '*esse* is *percipi*' to '*esse* is *concipi*'—to the distress of empiricists and the delight of rationalist idealists.

Here again we must avoid taking Berkeley's sentences in isolation. Sensation remains for him the only way of becoming acquainted with the corporeal; its objects are still for him just what they appear to be, and they are realities, not subjective effects of a matter alleged to be sensorily inaccessible to us. He has not moved towards either Descartes or Locke. Sensation is veridical apprehension. *Siris* introduces no change in these respects. The change is one of emphasis or valuation, with a change of terminology. He re-defines the term 'knowing', confining it to reasoning, and quoting Plato's view as a precedent (Sect. 305):[1] it is the apprehension of causes. That causes can only be apprehended by reason he had always maintained.[2] That causes are more important than effects he had always assumed; now, however, he puts his stress here, and so heavily that he will give only to the grasp of the important the dignity of the name of knowledge.

His general disparagement of sensing and of the sensory realm is plainly Platonic, a judgment on the metaphysically and ethically inferior. In Sect. 254 he writes in his old vein, lauding Nature as a theophany, but usually he now speaks of it as a screen and a snare, keeping men from raising their eyes higher, and chaining them down to vulgar interests and base affections. This is a change not of doctrine but of mood, comparable with the difference between, for instance, the *Symposium* and the *Phaedo* of Plato, and even so not without anticipation in Berkeley's earlier works (*e.g.* the conclusion of the *Principles*). It is a mood which philosophers, like saints and poets, are very subject to. Parallels are numerous, for instance Descartes (*Discours de la méthode*, PT. IV): men 'are so accustomed to considering nothing

[1] Cp. Hobbes: 'Although sense and memory of things, which are common to man and all living things, be knowledge, yet because they be given us immediately by Nature and not gotten by ratiocination, they are not philosophy' (*Concerning Body*, 1656, ch. 1). This is what Berkeley meant.

[2] *E.g. De motu*, Sect. 40: 'By means of the senses we perceive nothing but effects,' and *Three Dialogues*, 1 (VOL. II, p. 175, of this edition).

except by way of imagination, which is a mode of thinking limited to material objects, that all that is not imaginable seems to them not intelligible.' This is the burden of both the early and the late complaint of Berkeley as a moralist. Cp. *Siris*, Sects. 264, 292, 294, 330f.

(3) *Concerning the metaphysical order.* In this connexion the *Principles* and *Siris* certainly belong to different climates of thought. The one expounds with piercing clarity and perfect logical economy a rational theism; the other expatiates in the supercelestial arcana of the Neoplatonists. To pass from the one to the other is like returning from the eighteenth century, of which the early Berkeley was a peculiarly brilliant representative, bringing his thoughts into the noonday light, to the seventeenth, to the often crepuscular pages of the Cambridge Platonists, the English heirs in theology and philosophy of the Florentine Renaissance. Berkeley had always been, indeed, a lover of Plato, but never a Platonist. In his *Philosophical Commentaries* (entry 300) he confessed that he had 'oft found it difficult to understand those that use the lofty and Platonic strain.' Now, however, he reproduces that strain, its very terms as well as its concepts.[1]

All this is true, but one should be careful of going further. Expositors of the metaphysical part of *Siris* have lightly attributed to Berkeley views which he is reporting, and perhaps only reporting. In many passages I find it hard to discern whether or no he is approving a doctrine which he mentions, and if he is, whether he is approving it in the full sense of making it his own. Many of the ancient articles which he adduces without criticism, and sometimes even with praise, he did not and could not agree with. He exhibits them with pleasure because they give classical support to his own general contention that the world lies under a divine spirit. That the great ancients cannot be charged with atheism is the organizing refrain of the last seventy or eighty sections (see note on Sect. 276). He is here putting himself in the company of generally kindred spirits, enjoying and defending a broad similarity of purpose, not appropriating their particular philosophoumena.[2] Their maxims, he says expressly, 'are not proposed as principles, but barely as hints to awaken and exercise the inquisitive reader' (Sect. 350).

[1] In his many references to the Neoplatonists he remains silent about Porphyry, of whom he had written witheringly in *Alciphron*, VI, 25. Porphyry had composed a lengthy polemic against Christianity.

[2] In that sense he had approved Plato's *Timaeus* even in *De motu*, Sect. 32.

I doubt if any of the sections can be read unambiguously as an acceptance by Berkeley of a Platonic world of abiding Forms. He is clearly attracted, in a way he has not shown signs of before, by the distinction between the fleetingness of the corporeal and the abidingness of the 'truly real' (Sects. 336, 342, 348); and he now calls sensory objects 'phenomena' instead of 'ideas' (though without losing the essential reference to mind; cp. Sect. 251). Nevertheless, he seems to me to stop short of Platonism. The relevant considerations may be indicated under three heads. (*a*) He could not accept a realm of self-existent essences, for in *Siris* he still holds that everything is either a mind or an object inseparable from mind. He could write of Plato's Forms without disapproval because, like all his contemporaries, he saw Platonism through Neoplatonic spectacles, and therefore understood the Forms to be ideas in the mind of God. (*b*) In this sense he could have accepted some of the Forms without inconsistency with his distinctive position. Justice, for instance, is not an abstraction in the sense which he had dismissed, for it is a mental and not a corporeal object, an *intellectum* from the start, not an alleged derivate from sense, and therefore it does not fall under the *esse-percipi* formula.[1] In its perfect form it could be a notion in (as well as a quality of) God's mind, just as it can be, imperfectly, a notion in ours. (*c*) As for archetypes of natural objects, the *possibility* of them appears to be admitted in *Principles*, Sects. 9, 45 and 99, and is admitted in a letter of 24 March 1730 to Johnson (in VOL. II of this edition, p. 292). In this letter, however, and in *Principles*, Sect. 86, he states quite clearly the kind of archetype which he is bound to reject—a corporeal entity posited as existing independently of all mind and as the 'real object' and cause of our supposedly subjective sensations. Such archetypes—material things as understood by the Cartesians, Locke and the scientists—he rejected on the epistemological ground that they require a representative theory of perception, which logically entails scepticism, since it excludes the possibility of comparing the sensed object and the supposed 'real object.' Archetypes in the sense of *models* in the mind of God are not open to that objection, for they would not be part of the *epistemological* situation. Whether there are any such is a point on which Berkeley never declared himself in his earlier period, never needing to do so, since he never then raised

[1] Similarly in *Alciphron*, VI, 17 he could properly write of 'an abstract idea of moral fitness.'

the question to which the postulation of divine paradigms would be an answer; and I am not at all sure that he declares himself in *Siris*. What he had been concerned to establish was that the only *corporeal* realities there are are the objects which we immediately apprehend in sense, that these are directly produced by God, and that they are wholly sustained by God's awareness of them. In what form God's plan of creation exists within His mind is a question of divine psychology which Berkeley neither raises nor is obliged to raise.

So much on the apparent inconsistencies.[1] For the rest, certain broad differences between *Siris* and his earlier philosophical works may be summarized briefly. (*a*) *Siris* passes beyond the theory of perception to natural science, and to a cosmology or metaphysic of Nature. In the latter it is frankly speculative; but Berkeley had always taken for granted the right of reason to infer beyond experience. (*b*) It handles its themes in a desultory and tentative or relatively inconclusive way, not by rigid demonstration but by disciplined meditation. An orderly mind has set itself to sustained brooding. (*c*) It is erudite, heavy with authorities ancient and modern, very unlike the clean, stripped, athletic pages of the *Principles*. The author was standing by his bookshelves, pulling out tome after tome, no longer sitting steadily at his desk easily communicating the lucid contents of his own thinking. This feature, however, was not altogether new, but the culmination of a tendency: in *De motu* he had quoted modern authorities, and in *Alciphron* (*e.g.* III, 13f.; IV, 19; VI, 12, 21–6) ancient ones, and had closed this latter work, written in the leisure of Rhode Island, with a plea for the study of 'the wise men of antiquity.' (*d*) Though still breathing his characteristic serenity, it lacks the free confidence of his early works. He no longer believes that he can reform all science, all philosophy, and the lives of his contemporaries, by correcting the fashionable epistemology and giving a new short proof of the existence of God. He finds the former daylight deceptively clear; the sense of mystery, which had affirmed itself combatively in *Alciphron* and the *Analyst*, has become a settled mood. He now feels as well as knows that *omnia exeunt in mysterium*. He is in Plato's cave (Sects. 263, 340, 368), straining his eyes, though rewarded enough to

[1] It has been alleged that Berkeley's earlier teleology makes man the end of Nature, his later teleology God. But he was never anthropocentric: all things exist for God's glory. So far as he placed his emphasis on final causes (*Siris*, Sect. 260), he had always been a Platonist (*Principles*, Sect. 107).

maintain his effort and his hope. Natural truth is bigger, and harder to get, than he had once supposed, and he is humbled, yet thankful for the instalment he is receiving. The ideal is remote, but he believes that our fumbling approximations have their validity as well as their use. He had come to see what the Quaker Isaac Pennington had set down as the sum of reflective wisdom: 'All truth is a shadow except the last. But every truth is substance in its own place, though it must be but a shadow in another place. And the shadow is a true shadow as the substance is a true substance.' This was the lesson he was learning from the Neoplatonists. He was no longer adding anything to the philosophical tradition, but was incorporating into this his own early contribution, as still true but incomplete; and in this modest commerce with his predecessors he was folding his hands in expectation of early admission to the life in which what he was groping to infer would be clearly seen.

Analysis of 'Siris'

I. *Wood-tar and Tar-water:*

Sects. 1–9. Tar-water: its preparation, use and properties.

Directions for making it. Tar-water, being a balsam, contains an acid spirit (*vis*), a volatile salt, soluble, unlike the resinous part, in water. The practical requirement (*Sect.* 12) is to separate this acid from the attendant oils which the stomach cannot tolerate.

Sects. 10–28. The extraction of tar from pines and firs.

Ancient and modern practice. It is the abundance of balsam in pines and firs that makes them evergreen. Tar is similar in origin and medical effect to turpentine.

Sects. 29–39. The anatomy and physiology of plants.

Plants are analogous in structure and functions to animals. The acid spirit is the immediate source of their life.

Sects. 40–45. Solar light the source of vegetable life.

The volatile acid spirit, which constitutes the specific life of the plant, is formed by the light of the sun.

Sects. 46–71. The general medicinal virtues of tar-water.

Its advantages over both distilled oils and solutions of resin. Its general effects in the animal body are all beneficial. As a

deobstruent it is superior to water and mercury. Since it is an oil holding an acid salt it is a soap, has the medicinal properties of soap, and is safer than alkaline soap. It is also safer than turpentine, and more efficacious than wood-decoctions, mineral waters, cordials, emetics and purgatives. It is safer than the three near-panaceas—soap, opium, and mercury.

Sects. 72–119. The particular ills for which tar-water can be recommended.

Fevers, pneumonia, pleurisy, dysentery, gout, smallpox, disorders of the urinary passages, nervous complaints, indigestion, hypochondria and hysteria. A preservative of teeth, gums and voice. A corrective for sedentary scholars. Remarks on rich diet and spirit-drinking (*Sects.* 103–10).

II. *Chemical Agencies:*

Sects. 120–36. The chemistry of acids and salts.

The acid spirit in plants is medicinally good because it is gentle, and, being the most volatile of their salts, it, and even its vehicle of volatile oil, are conveniently soluble in water (in distillation tending to escape). It is an elementary acid, present everywhere, though never alone, being joined with elementary sulphur. With the help of water it makes soil soluble, and thereby assimilable by plants. Newton's theory, that acids unite with other substances by attraction, is preferable to Homberg's, that they unite by virtue of their shape.

Sects. 137–51. The chemistry of air.

Air is the source of all generation and corruption of animate and inanimate things. It is not an element, but a mixture of exhalations from the earth, combined with a spirit (*vis*) that may fitly be called Aether or Fire, to which air owes its distinctive properties of elasticity and volatility.

III. *The Philosophy of Nature:*

Sects. 152–219. The natural primacy of Aether or Fire.

Sects. 152–65. Aetherial Fire (the substance of light) as the vital principle of the corporeal world. The only *agent* in all reality is mind, all corporeal 'causes' being styled such in an improper sense, being instruments only, necessary not for the production of events but for the uniform course of Nature that is requisite for both our understanding and our practice. Aether

is the first corporeal instrument of the supreme Mind. It is linked mechanically with air and, through this, with all things, so maintaining the cycle of generation and corruption. It corresponds in the whole to the vital principle in the particular body, and, like this, is discernible only in its effects.

Sects. 166–76. Fire in Greek philosophy. The theory of an Aether, holding within it the natural 'causes' of all sublunary things, is found in various guises in Heraclitus, the Stoics, the Pythagoreans, Plato, Aristotle, Empedocles, Anaximenes and Hippocrates. In general, these thinkers regarded Fire as causative only because of an indwelling mind.

Sects. 177–87. Fire in Oriental philosophy. Much of the Greek philosophy came from the East. A high place was given to Light or Fire in the Hermetic books of Egypt, in the Chaldaean Oracles, in Chinese speculation, by the Parsees, and in the Jewish and Christian scriptures.

Sects. 188–205. Fire in modern chemistry. Some of the moderns have made Fire primary. Homberg asserts that elementary sulphur is the substance of light or fire, is present everywhere, and is the only active principle, not discoverable in chemical analysis but evident in its effects. Boerhaave and others distinguish an elementary invisible fire from visible flame, and find in it the source of all physical and chemical activity. This Fire, naturally ingenerable, enters into compounds and permeates everything, especially the air, which thence derives its elasticity. It is the vehicle only, not the food, of visible fire. It is the vital spark in us; and it is the source of the acid spirit of tar and of all plants (*Sects.* 202; also 128, 227).

Sects. 206–11. Aetherial Fire is not incorporeal. The view of Proclus, Ficino and some Pythagoreans that it is, examined and rejected.

Sects. 212–19. The action of aetherial Fire in plant and animal life, through light, heat, air, and food.

Sects. 220–50. Mechanistic philosophy criticized.

Sects. 220–30. Newton's ether is unnecessary even in physics: Light or Fire is sufficient to account for the phenomena.

Sects. 231–50. Mechanics can go no further than the uniformities of phenomena. The laws of motion, in particular of attraction and repulsion, are only formulations of such uniformities; and even as such they are not universal, many motions

being peculiar. Newton's gravity is scientifically more useful than Descartes's vortices, but no mechanical theories deal with causes. Only effects are observable in the corporeal: attraction and repulsion are themselves but effects, forms of motion, phenomena, not explaining but needing explanation. The only agents are incorporeal.

IV. *The Dependence of the World on God:*

Sects. 251–64. Nature, non-causative, is the effect of a cosmic Mind.

The regularity of the connexions in Nature bespeaks an intelligent cause, and a benevolent one (though uniformities involve some natural evil). The connexions are not themselves causal; they depend on Aether, which itself depends for its actuation on a supreme Mind. Only in intellectual insight can we apprehend the level of truly causal power, for sense shows only bare phenomena, and experience only the given connexions of these. The sensory is neither the whole of the real nor the more important part of it, priority belonging to mind, and cosmic priority to a divine Mind.

Sects. 265–332. The wisdom of the ancients: their authority supports the spiritual interpretation of the universe.

Sects. 265–86. The prescient Greeks and Egyptians were in general concurrent. The Platonists and Pythagoreans rested the world on a benevolent mind; so also did the old Egyptians. Both the Greeks and the Egyptians, unlike and better than the moderns, had no room for an absolute space, an absolute material system, or a blind fate. For them the world was a living being, a single whole directed by an indwelling *Anima*. Even those who did not explicitly place the *Anima* under an Intellect were not atheistic in either fact or intention. Such ancients as interpreted the world materialistically were exceptional, and were justly condemned by Aristotle.

Sects. 287-97. The World as One. This hoary doctrine, even when it took a pantheistic form, was not atheistic, though God cannot really be either part of a whole or a whole of parts. The doctrine that the world is an animate being implies the unity of the world, though God cannot rightly be identified with the *Anima*, for He has no sensation, being neither passive nor limited by a body. Nor can the *Anima* or Aether be the origin of the

world's unity and changes, for it is corporeal. To suppose it to be the origin is to take the corporeal as ultimate and to base all knowledge on physical science. Philosophy rises from the corporeal to the mental, which alone is causative.

Sects. 298–302. The philosophical wisdom that sees the world as one whole subject to a mind is so ancient that it must have come through divine revelation.

Sects. 303–19. The chain of knowledge and being. Plato and Aristotle saw that sensation is not knowledge, for its objects are fleeting, never in being but always passing into and out of being. Reason goes beyond sensation by adducing causes. The objects of sense come to our minds from without, but in both origin and existence they are inseparably linked with mind. The supposition of a self-existent corporeal world has no support in the best philosophy of Greece.

Sects. 320–32. The theology of the ancients. That the world depends entirely on a divine Mind is the massive testimony of the philosophies of Greece and Egypt. The neglect of these, especially of Aristotle, Platonism and Pythagoreanism, is one reason of the contemporary misfortune of practical materialism.

Sects. 333–68. The knowledge of God.

Sects. 333–40. The difficulty of knowing God: the struggle of intellect to emerge from the coils of sense, and its relapses.

Sects. 341–68. The divine hypostases as expounded by the ancient heathens adumbrate the Christian doctrine of the Trinity. That the first hypostasis, the *fons deitatis*, is the One, is widely testified. In the One the finite mind participates by virtue of its own unity, which constitutes it as a person (only minds have intrinsic unity, the unity of its objects being imputed or conferred). Hence the movement of the finite mind towards God is 'the flight of the One to the One.' The early and recurrent theory that the One is beyond all predicates, though erroneous, is not atheistic. The second and third hypostases are conceived and named in various ways. That the notion of a Trinity occurs in so many of the ancients is remarkable. The knowledge of God is in this life obscure, but those who are called to truth can, with labour, find rewarding parts of it.

Siris:
A Chain of Philosophical Reflexions and Inquiries

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SIRIS:

A CHAIN OF PHILOSOPHICAL REFLEXIONS AND INQUIRIES, ETC.

For introduction to the following piece, I assure the reader that nothing could, in my present situation, have induced me to be at the pains of writing it but a firm belief that it would prove a valuable present to the public. What entertainment soever the reasoning or notional part may afford the mind, I will venture to say the other part seemeth so surely calculated to do good to the body that both must be gainers. For if the lute be not well tuned, the musician fails of his harmony.[1] And, in our present state, the operations of the mind so far depend on the right tone or good condition of its instrument, that anything which greatly contributes to preserve or recover the health of the body is well worth the attention of the mind. These considerations have moved me to communicate to the public the salutary virtues of tar-water; to which I thought myself indispensably obliged by the duty every man owes to mankind. And, as effects are linked with their causes, my thoughts on this low but useful theme led to farther inquiries, and those on to others, remote perhaps and speculative, but, I hope, not altogether useless or unentertaining.

1 [2] In certain parts of America, tar-water is made by putting a quart of cold water to a quart of tar, and stirring them well together in a vessel, which is left standing till the tar sinks to the bottom. A glass of clear water, being poured off for a draught, is replaced by the same quantity of fresh water, the vessel being shaken and left to stand as before. And this is repeated for every glass, so long as the tar continues to impregnate the water sufficiently, which will appear by the smell and taste. But, as

TITLE *Siris not in B.* *l* 27 *will appear—(E) appears.*

[1] [An echo of Plotinus, II, iii, 13: cp. also I, iv, 16—when our instrument fails us, we move into a life where 'we may sing without accompaniment' (ᾄδων ἄνευ ὀργάνου).—Ed.] [2] [Note the change of detail in the directions in the editions, and compare with the directions below, pp. 171, 181, 207. With Sect 3, read Sects. 115, 217.—Ed.]

this method produceth tar-water of different degrees of strength, I choose to make it in the following manner: Pour a gallon of cold water on a quart of tar, and stir and mix them thoroughly with a ladle or flat stick, for the space of three or four minutes, after which the vessel must stand eight and forty hours, that the tar may have time to subside; when the clear water is to be poured off and kept covered for use, no more being made from the same tar, which may still serve for common purposes.

2 The cold infusion of tar hath been used in some of our colonies as a preservative or preparative against the small-pox, which foreign practice induced me to try it in my own neighbourhood, when the small-pox raged with great violence.[1] And the trial fully answered my expectation, all those within my knowledge who took the tar-water having either escaped that distemper or had it very favourably. In one family there was a remarkable instance of seven children, who came all very well through the small-pox, except one young child which could not be brought to drink tar-water as the rest had done.

3 Several were preserved from taking the small-pox by the use of this liquor; others had it in the mildest manner; and others, that they might be able to take the infection, were obliged to intermit drinking the tar-water. I have found it may be drunk with great safety and success for any length of time, and this not only before, but also during the distemper. The general rule for taking it is, about half a pint night and morning on an empty stomach, which quantity may be varied, according to the case and age of the patient, provided it be always taken on an empty stomach, and about two hours before or after a meal. For children and squeamish persons it may

l 1 *different*—(*E*) *a nauseous kind and different.* *l* 3 *stir and mix*—(*E*) *stir, work and mix.* *l* 4 *with a ladle*—(*E*) *together with a wooden ladle.* *l* 4 *three or four*—(*E*) *five or six.* *l* 5 *eight and forty hours*—(*E*) *close covered and unmoved three days and nights.* *l* 6 *time*—(*E*) *full time.* *l* 6 *when*—(*E*) *and then.* *l* 6 *is to be*—(*E*) *having been first carefully skimmed without shaking the vessel, is to be.* *l* 7 *kept covered*—(*A, B*) *kept;* (*E*) *kept in bottles well stopped.* *l* 7 *for use*—(*E has footnote*) *I make this water stronger than that first prescribed in Siris, having found, on more general experience, that five or six minutes' stirring, when the water is carefully cleared and skimmed, agrees with most stomachs.* *l* 8 *purposes*—(*E*) *uses.* *l* 9 *The cold*—(*A, B, C, D*) *This cold.* *l* 29 *For children . . . carelessly made* (*not in A, B, C*).

[1] [See Sect. 77. Below, p. 191, Berkeley says that he had heard of tar-water as a preventive only, not as a cure, of smallpox; and p. 210, he suggests a hospital experiment.—Ed.]

be made weaker, and given little and often; more cold water or less stirring makes it weaker, as less water or more stirring makes it stronger. It should not be lighter than French, nor deeper coloured than Spanish white wine. If a spirit be not very sensibly perceived on drinking, either the tar must have been bad, or already used, or the tar-water carelessly made.

4 It seemed probable that a medicine of such efficacy in a distemper attended with so many purulent ulcers might be also useful in other foulnesses of the blood; accordingly, I tried it on several persons infected with cutaneous eruptions and ulcers, who were soon relieved, and soon after cured. Encouraged by these successes, I ventured to advise it in the foulest distempers, wherein it proved much more successful than salivations [1] and wood-drinks had done.

5 Having tried it in a great variety of cases, I found it succeeded beyond my hopes—in a tedious and painful ulceration of the bowels; in a consumptive cough, and (as appeared by expectorated pus) an ulcer in the lungs; in a pleurisy and peripneumony.[2] And when a person who for some years had been subject to erysipelatous fevers perceived the usual fore-running symptoms to come on, I advised her to drink tar-water, which prevented the erysipelas.

6 I never knew anything so good for the stomach as tar-water: it cures indigestion and gives a good appetite. It is an excellent medicine in an asthma. It imparts a kindly warmth and quick circulation to the juices without heating, and is therefore useful, not only as a pectoral and balsamic, but also as a powerful and safe deobstruent in cachectic [3] and hysteric cases. As it is both healing and diuretic it is very good for the gravel. I believe it to be of great use in a dropsy, having known it cure a very bad anasarca in a person whose thirst, though very extraordinary, was in a short time removed by the drinking of tar-water.

7 The usefulness of this medicine in inflammatory cases is evident from what has been already observed (Sect. 5).

l 6 *made—(E adds) or kept. Particular experience will best shew how much and how strong the stomach can bear, and what are the properest times for taking it. I apprehend no danger from excess in the use of this medicine.*

[1] ['A method of cure much practised of late in venereal, scrophulous, and other obstinate cases, by promoting a secretion of spittle' (Johnson's *Dictionary*, 1755).—Ed.] [2] [Pneumonia.—Ed.] [3] ['Cachexy' covered a variety of disorders. Cp. Sect. 93.—Ed.]

And yet some perhaps may suspect that, as the tar itself is sulphureous, tar-water must be of a hot and inflaming nature. But it is to be noted that all balsams contain an acid spirit, which is in truth a volatile salt. Water is a menstruum that dissolves all sorts of salts, and draws them from their subjects. Tar, therefore, being a balsam, its salutary acid is extracted by water, which yet is incapable of dissolving its gross resinous parts, whose proper menstruum is spirit of wine. Therefore tar-water, not being impregnated with resin, may be safely used in inflammatory cases; and in fact it hath been found an admirable febrifuge, at once the safest cooler and cordial.[1]

8 The volatile salts separated by infusion from tar may be supposed to contain its specific virtues. Mr. Boyle[2] and other later chemists are agreed that fixed salts are much the same in all bodies. But it is well known that volatile salts do greatly differ, and the easier they are separated from the subject, the more do they possess of its specific qualities. Now the most easy separation is by the infusion of tar in cold water,[3] which to smell and taste shewing itself well impregnated may be presumed to extract and retain the most pure volatile and active particles of that vegetable balsam.

9 Tar was by the ancients[4] esteemed good against poisons, ulcers, the bites of venomous creatures; also for phthisical, scrofulous, paralytic, and asthmatic persons. But the method of rendering it an inoffensive medicine and agreeable to the stomach by extracting its virtues in cold water, was unknown to them. The leaves and tender tops of pine and fir are in our times used for diet-drinks, and allowed to be antiscorbutic and diuretic. But the most elaborate juice, salt, and spirit of those evergreens are to be found in tar, whose virtues extend not to animals alone, but also to vegetables. Mr. Evelyn, in his treatise on 'Forest Trees,'[5] observes with wonder that

l 31 *those*—(*E*) *these.*

[1] [One of several replies to the allegation that tar-water inflames: see Sects. 11, 47, 75, and pp. 182, 186, 195, 196, 210, 217.—Ed.] [2] [Robert Boyle (1627–91), one of the founders of the Royal Society; *princeps philosophorum*, Boerhaave calls him. Salts were currently classified as fixed (lixivious), volatile, and essential (got by crystallization).—Ed.] [3] [See note on Sect. 120.—Ed.] [4] [Pliny the Elder, *Historia naturalis*, XXIV, 22 ff.—Ed.] [5] [John Evelyn (1620–1706), the diarist, one of the founders of the Royal Society. *Sylva, or a Discourse of Forest Trees*, 1664.—Ed.]

stems of trees, smeared over with tar, are preserved thereby from being hurt by the envenomed teeth of goats and other injuries, while every other thing of an unctuous nature is highly prejudicial to them.

10 It seems that tar and turpentine may be had, more or less, from all sorts of pines and firs whatsoever; and that the native spirits and essential salts of those vegetables are the same in turpentine[1] and common tar. In effect, this vulgar tar, which cheapness and plenty may have rendered contemptible, appears to be an excellent balsam, containing the virtues of most other balsams; which it easily imparts to water, and by that means readily and inoffensively insinuates them into the habit of the body.

11 The resinous exudations of pines and firs are an important branch of the *Materia Medica*, and not only useful in the prescriptions of physicians, but have been also thought otherwise conducive to health. Pliny tells us that wines in the time of the old Romans were medicated with pitch and resin;[2] and Jonstonus in his *Dendrographia* observes[3] that it is wholesome to walk in groves of pine-trees, which impregnate the air with balsamic particles. That all turpentines and resins are good for the lungs, against gravel also and obstructions, is no secret; and that the medicinal properties of those drugs are found in tar-water, without heating the blood, or disordering the stomach, is confirmed by experience; and particularly, that phthisical and asthmatic persons receive speedy and great relief from the use of it.

12 Balsams, as all unctuous and oily medicines, create a nauseating in the stomach. They cannot therefore be taken in substance so much or so long as to produce all those salutary effects which, if thoroughly mixed with the blood and juices, they would be capable of producing. It must therefore be a thing of great benefit to be able to introduce any requisite quantity of their volatile parts into the finest ducts and capillaries, so as not to offend the stomach, but, on the contrary, to comfort and strengthen it in a great degree.

[1] [On turpentine see Sects, 20, 61, 113, and below, p. 176.—Ed.] [2] [*Hist. nat.*, XIV, 25. In Greece resinated wine, *retsinato*, is still extremely common (so I found there in 1949). 'English residents in Greece find it an excellent stomachic' (W. Miller, *Greek Life in Town and Country*, 1905, p. 298). Cp. Sect. 111 below.—Ed.] [3] [*Dendrographias, sive historiae naturalis de arboribus et fruticibus libri decem*, 1662, Frankfort, by Johannes Jonstonus (1603–75), a Polish scientist.—Ed.]

13 According to Pliny,[1] liquid pitch (as he calls it) or tar was obtained by setting fire to billets of old fat pines or firs. The first running was tar, the later or thicker running was pitch. Theophrastus[2] is more particular: he tells us the Macedonians made huge heaps of the cloven trunks of those trees, wherein the billets were placed erect beside each other; that such heaps or piles of wood were sometimes a hundred and eighty cubits round, and sixty or even a hundred high; and that, having covered them with sods of earth to prevent the flame from bursting forth (in which case the tar was lost), they set on fire those huge heaps of pine or fir, letting the tar and pitch run out in a channel.

14 Pliny saith it was customary for the ancients to hold fleeces of wool over the steam of boiling tar, and squeeze the moisture from them, which watery substance was called *pissinum.* Ray[3] will have this to be the same with the *pisselaeum* of the ancients; but Hardouin, in his notes on Pliny,[4] thinks the *pisselaeum* to have been produced from the cones of cedars. What use they made of these liquors anciently I know not; but it may be presumed they were used in medicine, though at present, for aught I can find, they are not used at all.

15 From the manner of procuring tar (Sect. 13) it plainly appears to be a natural production, lodged in the vessels of the tree, whence it is only freed and let loose (not made) by burning. If we may believe Pliny,[5] the first running or tar was called *cedrium,* and was of such efficacy to preserve from putrefaction that in Egypt they embalmed dead bodies with it. And to this he ascribes their mummies continuing uncorrupted for so many ages.

16 Some modern writers inform us that tar flows from the trunks of pines and firs, when they are very old, through incisions made in the bark near the root; that pitch is tar inspissated; and both are the oil of the tree grown thick and ripened with age and sun. The trees, like old men, being

l 35 *ripened*—(*A*, *B*, *C*) *black.*

[1] [*Hist. nat.*, XVI, 22.—Ed.] [2] [*Historia plantarum*, IX, 3. Theophrastus succeeded Aristotle as head of the Peripatetic school. He is accounted the first botanist. —Ed.] [3] [John Ray (1627–1705). *Historia plantarum* (3 vols., 1686, 1688, 1704), VOL. II, p. 1402.—Ed.] [4] [*Hist. nat.*, XV, 7. Father Hardouin's edition first appeared in 1685 (Paris).—Ed.] [5] [*Hist. nat.*, XVI, 21. Cp. Herodotus, II, 86 f.—Ed.]

unable to perspire, and their secretory ducts obstructed, they are, as one may say, choked and stuffed with their own juice.

17 The method used by our colonies in America for making tar and pitch is in effect the same with that of the ancient Macedonians; as appears from the account given in the *Philosophical Transactions*.[1] And the relation of Leo Africanus,[2] who describes, as an eye-witness, the making of tar on Mount Atlas, agrees in substance with the methods used by the Macedonians of old, and the people of New England at this day.

18 Jonstonus, in his *Dendrographia*, is of opinion that pitch was anciently made of cedar, as well as of the pine and fir grown old and oily. It should seem indeed that one and the same word was used by the ancients in a large sense, so as to comprehend the juices issuing from all those trees. Tar and all sorts of exudations from evergreens are in a general acceptation included under the name resin. Hard coarse resin or dry pitch is made from tar, by letting it blaze till the moisture is spent. Liquid resin is properly an oily viscid juice oozing from the bark of evergreen trees, either spontaneously or by incision. It is thought to be the oil of the bark inspissated by the sun. As it issues from the tree it is liquid, but becomes dry and hard, being condensed by the sun or by fire.

19 According to Theophrastus,[3] resin was obtained by stripping off the bark from pines, and by incisions made in the silver fir and the pitch pine. The inhabitants of Mount Ida, he tells us, stripped the trunk of the pine on the sunny side two or three cubits from the ground. He observes that a good pine might be made to yield resin every year; an indifferent every other year; and the weaker trees once in three years; and that three runnings were as much as a tree could bear. It is remarked by the same author that a pine doth not at once produce fruit and resin, but the former only in its youth, the latter in its old age.

20 Turpentine is a fine resin. Four kinds of this are in use. The turpentine of Chios or Cyprus, which flows from the turpentine tree: the Venice turpentine, which is got by piercing the larch tree: the Strasburg turpentine, which Mr. Ray[4] informs us is procured from the knots of the silver fir;

[1] [I have failed to find the article.—Ed.] [2] [Johannes Leo Africanus (*c.* 1494–1552). His 'Descrizione dell' Africa' first appeared in VOL. I. of *Navigazioni e Viaggi* by G. B. Ramusio, 1550. An English version of 1600 is reprinted in the Hakluyt Series, VOLS. 92–4, 1896: the passage is in VOL. III, p. 968. —Ed.] [3] [*Hist. plant.*, IX, 2.—Ed.] [4] [*Hist. plant.*, VOL. II, p. 1403.—Ed.]

it is fragrant and grows yellow with age: the fourth kind is common turpentine, neither transparent nor so liquid as the former, and this Mr. Ray taketh to flow from the mountain pine. All these turpentines are useful in the same intentions.[1] Theophrastus saith [2] the best resin or turpentine is got from the *terebinthus* growing in Syria and some of the Greek islands; the next best from the silver fir and pitch pine.

21 Turpentine is on all hands allowed to have great medicinal virtues. Tar and its infusion contain those virtues. Tar-water is extremely pectoral and restorative; and, if I may judge from what experience I have had, it possesseth the most valuable qualities ascribed to the several balsams of Peru, of Tolu, of Capivi, and even to the balm of Gilead, such is its virtue in asthmas and pleurisies, in obstructions and ulcerous erosions of the inward parts. Tar in substance mixed with honey I have found an excellent medicine for coughs. Balsams, as hath been already observed, are apt to offend the stomach, but tar-water may be taken without offending the stomach, for the strengthening whereof it is the best medicine I have ever tried.

22 The folly of man rateth things by their scarceness, but Providence hath made the most useful things most common. Among those liquid oily extracts from trees and shrubs which are termed balsams, and valued for medicinal virtues, tar may hold its place as a most valuable balsam. Its fragrancy sheweth that it is possessed of active qualities, and its oiliness that it is fitted to retain them. This excellent balsam may be purchased for a penny a pound, whereas the balsam of Judæa, when most plenty, was sold on the very spot that produced it for double its weight in silver, if we may credit Pliny; [3] who also informs us that the best balsam of Judæa flowed only from the bark, and that it was adulterated with resin and oil of turpentine. Now, comparing the virtues I have experienced in tar with those I find ascribed to the precious balm of Judæa, of Gilead, or of Mecha (as it is diversely called), I am of opinion that the latter is not a medicine of more value or efficacy than the former.

23 Pliny [4] supposed amber to be a resin, and to distil from some species of pine—which he gathered from its smell. Nevertheless, its being dug out of the earth shews it to be a fossil,

l 15 *Tar . . . coughs (not in C).*

[1] [In the medical sense of *curationis intentio*, 'scheme or aim of treatment', as in Sect. 76.—Ed.] [2] [*Hist. plant.*, IX, 2.—Ed.] [3] [*Hist. nat.*, XII, 54.—Ed.] [4] [*Id.*, XXXVII, 3 *ad init.*—Ed.]

though of a very different kind from other fossils. But thus much is certain, that the medicinal virtues of amber are to be found in the balsamic juices of pines and firs. Particularly the virtues of the most valuable preparation, I mean salt of amber,[1] are in a great degree answered by tar-water, as a detergent, diaphoretic, and diuretic.

24 There is, as hath been already observed, more or less oil and balsam in all evergreen trees, which retains the acid spirit, that principle of life and verdure; the not retaining whereof in sufficient quantity causeth other plants to droop and wither. Of these evergreen trees productive of resin, pitch and tar, Pliny enumerates[2] six kinds in Europe; Jonstonus reckons up thrice that number of the pine and fir family. And, indeed, their number, their variety, and their likeness, makes it difficult to be exact.

25 It is remarked both by Theophrastus[3] and Jonstonus that trees growing in low and shady places do not yield so good tar as those which grow in higher and more exposed situations. And Theophrastus further observes that the inhabitants of Mount Ida in Asia, who distinguish the Idæan pine from the maritime, affirm that the tar flowing from the former is in greater plenty, as well as more fragrant, than the other. Hence, it should seem the pines or firs in the mountains of Scotland might be employed that way, and rendered valuable, even where the timber, by its remoteness from water-carriage, is of small value. What we call the Scotch fir is falsely so called, being in truth a wild forest pine, and (as Mr. Ray informs us)[4] agreeing much with the description of a pine growing on Mount Olympus in Phrygia, probably the only place where it is found out of these islands, in which of late years it is so much planted and cultivated with so little advantage, while the cedar of Lebanon might perhaps be raised, with little more trouble, and much more profit and ornament.

26 The pines, which differ from the firs in the length and disposition of their leaves and hardness of the wood, do not, in Pliny's account,[5] yield so much resin as the fir-trees. Several species of both are accurately described and delineated by the naturalists. But they all agree so far as to seem related. Theophrastus[6] gives the preference to that resin which is got from

[1] [Succinic acid.—Ed.] [2] [*Op. cit.*, xvi, 16.—Ed.] [3] [*Hist. plant.*, ix, 2, . —Ed.] [4] [*Hist. plant.*, vol. ii, p. 1401.—Ed.] [5] [*Hist. nat.*, xvi, 16–18.—Ed.] [6] [*Hist. plant.*, ix, 2, ii.—Ed.]

the silver fir and pitch-tree (ἐλάτη and πίτυς) before that yielded by the pine, which yet he saith is in greater plenty. Pliny, on the contrary, affirms that the pine produceth the smallest quantity. It should seem therefore that the interpreter of Theophrastus might have been mistaken in rendering πεύκη by *pinus*; as well as Jonstonus, who likewise takes the pine for the πεύκη of Theophrastus. Hardouin will have the *pinus* of Pliny to have been by others called πεύκη, but by Theophrastus πίτυς. Ray thinks the common fir, or *picea* of the Latins, to be the male fir of Theophrastus.[1] This was probably the spruce fir; for the *picea*, according to Pliny,[2] yields much resin, loves a cold and mountainous situation, and is distinguished, *tonsili facilitate*, by its fitness to be shorn, which agrees with the spruce-fir, whereof I have seen close-shorn hedges.

27 There seems to have been some confusion in the naming of these trees, as well among the ancients as the moderns. The ancient Greek and Latin names are by later authors applied very differently. Pliny[3] himself acknowledgeth it is not easy even for the skilful to distinguish the trees by their leaves, and know their sexes and kinds; and that difficulty is since much increased by the discovery of many new species of that evergreen tribe, growing in various parts of the globe. But descriptions are not so easily misapplied as names. Theophrastus tells that πίτυς differeth from πέυκη, among other things, in that it is neither so tall nor so straight, nor hath so large a leaf. The fir he distinguisheth into male and female: the latter is softer timber than the male; it is also a taller and fairer tree, and this is probably the silver fir.

28 To say no more on this obscure business, which I leave to the critics, I shall observe that according to Theophrastus not only the turpentine trees, the pines, and the firs yield resin or tar, but also the cedars and palm-trees; and the words *pix* and *resina* are taken by Pliny in so large a sense as to include the weepings of the *lentiscus* and cypress, and the balms of Arabia and Judæa; all which perhaps are near of kin, and in their most useful qualities concur with common tar, especially the Norwegian, which is the most liquid and best for medicinal uses of any that I have experienced. Those trees that grow on mountains, exposed to the sun or the north wind, are reckoned by Theo-

[1] [πεύκη and πίτυς are distinguished by Theophrastus in *Hist. plant.*, III, ix, 5; Ray, *Hist. plant.*, VOL. II (1688), p. 1396.—Ed.] [2] [*Hist. nat.*, XVI, 18.—Ed.] [3] [*Ibid.*, 19.—Ed.]

phrastus to produce the best and purest tar;[1] and the Idæan pines were distinguished from those growing on the plain, as yielding a thinner, sweeter, and better scented tar, all which differences I think I have observed between the tar that comes from Norway and that which comes from low and swampy countries.

29 Agreeably to the old observation of the Peripatetics, that heat gathereth homogeneous things and disperseth such as are heterogeneous, we find Chemistry is fitted for the analysis of bodies.[2] But the chemistry of nature is much more perfect than that of human art, inasmuch as it joineth to the power of heat that of the most exquisite mechanism. Those who have examined the structure of trees and plants by microscopes[3] have discovered an admirable variety of fine capillary tubes and vessels, fitted for several purposes, as the imbibing or attracting of proper nourishment, the distributing thereof through all parts of the vegetable, the discharge of superfluities, the secretion of particular juices. They are found to have ducts answering to the tracheæ in animals, for the conveying of air; they have others answering to lacteals, arteries, and veins. They feed, digest, respire, perspire, and generate their kind, and are provided with organs nicely fitted for all those uses.

30 The sap vessels are observed to be fine tubes running up through the trunk from the root. Secretory vessels are found in the bark, buds, leaves, and flowers. Exhaling vessels, for carrying off excrementitious parts, are discovered throughout the whole surface of the vegetable. And (though this point be not so well agreed) Dr. Grew, in his *Anatomy of Plants*,[4] thinks there appears a circulation of the sap, moving downwards in the root, and feeding the trunk upwards.

31 Some difference indeed there is between learned men concerning the proper use of certain parts of vegetables. But whether the discoverers have rightly guessed at all their uses or no, thus much is certain, that there are innumerable fine and curious parts in a vegetable body, and a wonderful similitude or analogy

[1] [*Hist. plant.*, IX, 2, iii.—Ed.] [2] [Until, and for some time after, Berkeley's day, chemical experiment commonly took the form of combustion. 'Nulla ars imitari sollertiam naturae potest,' Cicero, *De nat. deorum*, I, 33.—Ed.] [3] [Referring to the pioneer work of Marcello Malpighi (1628–94) and Nehemiah Grew (1641–1712) the founders of vegetable anatomy. The genus *Grewia* was named after the latter by Linnaeus.—Ed.] [4] [1682, London. BK. i, ch. 2, § 30.—Ed.]

between the mechanism of plants and animals. And perhaps some will think it not unreasonable to suppose the mechanism of plants more curious than even that of animals, if we consider not only the several juices secreted by different parts of the same plant, but also the endless variety of juices drawn and formed out of the same soil by various species of vegetables, which must therefore differ in an endless variety, as to the texture of their absorbent vessels and secretory ducts.

32 A body, therefore, either animal or vegetable, may be considered as an organized system of tubes and vessels, containing several sorts of fluids. And as fluids are moved through the vessels of animal bodies by the systole and diastole of the heart, the alternate expansion and condensation of the air, and the oscillations in the membranes and tunics of the vessels, even so, by means of air expanded and contracted in the tracheæ or vessels made up of elastic fibres, the sap is propelled through the arterial tubes of a plant, and the vegetable juices, as they are rarefied by heat or condensed by cold, will either ascend and evaporate into air, or descend in the form of a gross liquor.

33 Juices, therefore, first purified by straining through the fine pores of the root, are afterwards exalted by the action of the air and the vessels of the plant; but, above all, by the action of the sun's light, which, at the same time that it heats, doth wonderfully rarefy and raise the sap, till it perspires and forms an atmosphere, like the effluvia of animal bodies. And though the leaves are supposed to perform principally the office of lungs, breathing out excrementitious vapours and drawing in alimentary, yet it seems probable that the reciprocal actions of repulsion and attraction are performed all over the surface of vegetables as well as animals. In which reciprocation Hippocrates[1] supposeth the manner of nature's acting for the nourishment and health of animal bodies chiefly to consist. And, indeed, what share of a plant's nourishment is drawn, through the leaves and bark, from that ambient heterogeneous fluid called air, is not easy to say. It seems very considerable, and altogether necessary, as well to vegetable as animal life.

34 It is an opinion received by many that the sap circulates in plants as the blood in animals; that it ascends through capillary arteries in the trunk, into which are inosculated other vessels of the bark answering to veins, which bring back to the

[1] [*De Diaeta*, 1, 6, seems to be referred to.—Ed.]

root the remainder of the sap, over and above what had been deposited during its ascent by the arterial vessels, and secreted for the several uses of the vegetable throughout all its parts—stem, branches, leaves, flowers, and fruit. Others deny this circulation, and affirm that the sap doth not return through the bark vessels. It is nevertheless agreed by all that there are ascending and descending juices; while some will have the ascent and descent to be a circulation of the same juices through different vessels; others will have the ascending juice to be one sort attracted by the root, and the descending another imbibed by the leaves, or extremities of the branches; lastly, others think that the same juice, as it is rarefied or condensed by heat or cold, rises and subsides in the same tube. I shall not take upon me to decide this controversy. Only I cannot help observing that the vulgar argument from analogy between plants and animals loseth much of its force, if it be considered that the supposed circulating of the sap, from the root or lacteals through the arteries, and thence returning, by inosculations, through the veins or bark-vessels to the root or lacteals again, is in no sort conformable or analogous to the circulation of the blood.

35 It is sufficient to observe, what all must acknowledge, that a plant or tree is a very nice and complicated machine (Sects. 30, 31), by the several parts and motions whereof the crude juices, admitted through the absorbent vessels, whether of the root, trunk, or branches, are variously mixed, separated, altered, digested, and exalted, in a very wonderful manner. The juice, as it passeth in and out, up and down, through tubes of different textures, shapes, and sizes, and is affected by the alternate compression and expansion of elastic vessels, by the vicissitudes of seasons, the changes of weather, and the various action of the solar light, grows still more and more elaborate.

36 There is therefore no chemistry like that of nature, which addeth to the force of fire the most delicate, various, and artificial percolation (Sect. 29). The incessant action of the sun upon the elements of air, earth, and water, and on all sorts of mixed bodies, animal, vegetable, and fossil, is supposed to perform all sorts of chemical operations. Whence it should follow that the air contains all sorts of chemic productions, the vapours, fumes, oils, salts, and spirits of all the bodies we know; from which general aggregate or mass, those that are proper being drawn in through the fine vessels of the leaves, branches, and stem of the tree, undergo, in its various organs, new alterations, secretions, and

digestions, till such time as they assume the most elaborate form.

37 Nor is it to be wondered that the peculiar texture of each plant or tree, co-operating with the solar fire and pre-existing juices, should so alter the fine nourishment drawn from earth and air (Sect. 33), as to produce various specific qualities of great efficacy in medicine; especially if it be considered that in the opinion of learned men there is an influence on plants derived from the sun, besides its mere heat. Certainly, Dr. Grew, that curious anatomist of plants, holds the solar influence to differ from that of a mere culinary fire otherwise than by being only a more temperate and equal heat.[1]

38 The alimentary juice taken into the lacteals, if I may so say, of animals or vegetables, consists of oily, aqueous, and saline particles, which being dissolved, volatilized, and diversely agitated, part thereof is spent and exhaled into the air; and that part which remains is, by the economy of the plant and action of the sun, strained, purified, concocted, and ripened into an inspissated oil or balsam, and deposited in certain cells placed chiefly in the bark, which is thought to answer the *panniculus adiposus* in animals, defending trees from the weather and, when in sufficient quantity, rendering them evergreen. This balsam, weeping or sweating through the bark, hardens into resin; and this most copiously in the several species of pines and firs, whose oil being in greater quantity, and more tenacious of the acid spirit or vegetable soul (as perhaps it may not improperly be called), abides the action of the sun, and, attracting the sunbeams, is thereby exalted and enriched, so as to become a most noble medicine: such is the last product of a tree, perfectly maturated by time and sun.

39 It is remarked by Theophrastus[2] that all plants and trees while they put forth have most humour, but when they have ceased to germinate and bear, then the humour is strongest, and most sheweth the nature of the plant, and that, therefore, trees yielding resin should be cut after germination. It seems also very reasonable to suppose the juice of old trees, whose organs bring no new sap, should be better ripened than that of others.

l 13 *if . . . vegetables*—(*A*, *B*) *whether of animals or vegetables.*

[1] ['An Idea of a Philosophical History of Plants' (prefixed to his *Anatomy of Plants*, 1682), Sect. 61. Fraser's reading '*no* otherwise' has no support, and is the opposite of what Grew and Berkeley meant.—Ed.] [2] [*Hist. plant.*, IX, I. vi.—Ed.]

40 The aromatic flavours of vegetables seem to depend upon the sun's light as much as colours. As in the production of the latter, the reflecting powers of the object, so in that of the former, the attractive and organical powers of the plant co-operate with the sun (Sects. 36, 37). And as from Sir Isaac Newton's experiments it appears that all colours are virtually in the white light of the sun, and shew themselves when the rays are separated by the attracting and repelling powers of objects, even so the specific qualities of the elaborate juices of plants seem to be virtually or eminently contained in the solar light, and are actually exhibited upon the separation of the rays, by the peculiar powers of the capillary organs in vegetables, attracting and imbibing certain rays, which produce certain flavours and qualities, in like manner as certain rays, being reflected, produce certain colours.

41 It hath been observed by some curious anatomists that the secretory vessels in the glands of animal bodies are lined with a fine down, which in different glands is of different colours. And it is thought that each particular down, being originally imbued with its own proper juice, attracts none but that sort; by which means so many various juices are secreted in different parts of the body. And perhaps there may be something analogous to this in the fine absorbent vessels of plants, which may co-operate towards producing that endless variety of juices elaborated in plants from the same earth and air.

42 The balsam or essential oil of vegetables contains a spirit, wherein consist the specific qualities, the smell and taste, of the plant.[1] Boerhaave [2] holds the native presiding spirit to be neither oil, salt, earth, or water, but somewhat too fine and subtle to be caught alone and rendered visible to the eye. This, when suffered to fly off, for instance from the oil of rosemary, leaves it destitute of all flavour. This spark of life, this spirit or soul, if we may so say, of the vegetable departs without any sensible diminution of the oil or water wherein it was lodged.

43 It should seem that the forms, souls, or principles of vegetable life subsist in the light or solar emanation (Sect. 40), which in respect of the macrocosm is what the animal spirit

[1] [A current theory. Cp. Sir John Floyer's *Pharmako-Basanos, or the Touchstone of Medicine, discovering the Virtues of Vegetables, Minerals and Animals by their Tastes and Smells*, 1687, 2 vols. Berkeley refers explicitly to Floyer in Sect. 113. —Ed.] [2] [Hermann Boerhaave (1668–1738) of Leyden, the most famous physician of his day (see above, p. 11). *Elementa chemiae* (1732), VOL. I, p. 75. —Ed.]

is to the microcosm [1]—the interior tegument, the subtle instrument and vehicle of power. No wonder, then, that the *ens primum* or *scintilla spirituosa*, as it is called, of plants should be a thing so fine and fugacious as to escape our nicest search. It is evident that nature at the sun's approach vegetates, and languishes at his recess; this terrestrial globe seeming only a matrix disposed and prepared to receive life from his light; whence Homer in his *Hymns* styleth earth the wife of heaven, ἄλοχ' οὐρανοῦ ἀστερόεντος.[2]

44 The luminous spirit which is the form or life of a plant, from whence its differences and properties flow, is somewhat extremely volatile. It is not the oil, but a thing more subtle, whereof oil is the vehicle, which retains it from flying off, and is lodged in several parts of the plant, particularly in the cells of the bark and in the seeds. This oil, purified and exalted by the organical powers of the plant, and agitated by warmth, becomes a proper receptacle of the spirit; part of which spirit exhales through the leaves and flowers, and part is arrested by this unctuous humour that detains it in the plant. It is to be noted this essential oil, animated, as one may say, with the flavour of the plant, is very different from any spirit that can be procured from the same plant by fermentation.

45 Light impregnates air (Sects. 37, 43), air impregnates vapour; and this becomes a watery juice by distillation, having risen first in the cold still with a kindly gentle heat. This fragrant vegetable water is possessed of the specific odour and taste of the plant. It is remarked that distilled oils added to water for counterfeiting the vegetable water can never equal it, artificial chemistry falling short of the natural.

46 The less violence is used to nature the better its produce. The juice of olives or grapes issuing by the lightest pressure is best. Resins that drop from the branches spontaneously, or ooze upon the slightest incision, are the finest and most fragrant. And infusions are observed to act more strongly than decoctions of plants; the more subtle and volatile salts and spirits, which might be lost or corrupted by the latter, being obtained in their natural state by the former. It is also observed that the finest, purest, and most volatile part is that which first ascends in distillation. And, indeed, it should seem

[1] [The analogy between macrocosm and microcosm (also Sects. 154, 261, 361) was pressed by the ancient physiologists of the Peripatetic and Stoic schools. It was widely revived at the Renaissance.—Ed.] [2] [*Homeric Hymns*, xxx, 17. —Ed.]

the lightest and most active particles required least force to disengage them from the subject.

47 The salts, therefore, and more active spirits of the tar are got by infusion in cold water; but the resinous part is not to be dissolved thereby (Sect. 7). Hence the prejudice which some perhaps may entertain against tar-water as a medicine, the use whereof might inflame the blood by its sulphur and resin, appears to be not well grounded; it being indeed impregnated with a fine acid spirit, balsamic, cooling, diuretic, and possessed of many other virtues (Sects. 42, 44). Spirits are supposed to consist of salts and phlegm, probably, too, somewhat of a fine oily nature, differing from oil in that it mixeth with water, and agreeing with oil in that it runneth in rivulets by distillation. Thus much is allowed, that the water, earth, and fixed salt are the same in all plants; that, therefore, which differenceth a plant, or makes it what it is—the native spark or form, in the language of the chemists or schools—is none of those things, nor yet the finest oil, which seemeth only its receptacle or vehicle. It is observed by chemists that all sorts of balsamic wood afford an acid spirit, which is the volatile oily salt of the vegetable; herein are chiefly contained their medicinal virtues; and, by the trials I have made, it appears that the acid spirit in tar-water possesseth the virtues, in an eminent degree, of that of *guaiacum* and other medicinal woods.

48 Qualities in a degree too strong for human nature to subdue and assimilate to itself must hurt the constitution. All acids, therefore, may not be useful or innocent. But this seemeth an acid so thoroughly concocted, so gentle, bland, and temperate, and withal a spirit so fine and volatile, as readily to enter the smallest vessels, and be assimilated with the utmost ease.

49 If any one were minded to dissolve some of the resin, together with the salt or spirit, he need only mix some spirit of wine with the water. But such an entire solution of resins and gums as to qualify them for entering and pervading the animal system, like the fine acid spirit that first flies off from the subject, is perhaps impossible to obtain. It is an apophthegm of the chemists, derived from Helmont,[1] that whoever can make

l 21 *are*—(*A*, *B*) *is*.

[1] [J. B. van Helmont (1577–1644), Flemish chemist and physician (he coined the word 'gas'). The reference is to his *Arcana Paracelsi* (*Opera Omnia*, 1707, p. 740).—Ed.]

myrrh soluble by the human body has the secret of prolonging his days; and Boerhaave[1] owns that there seems to be truth in this, from its resisting putrefaction. Now, this quality is as remarkable in tar, with which the ancients embalmed and preserved dead bodies.[2] And though Boerhaave himself, and other chemists before him, have given methods for making solutions of myrrh, yet it is by means of alcohol, which extracts only the inflammable parts. And it doth not seem that any solution of myrrh is impregnated with its salt or acid spirit. It may not, therefore, seem strange if this water should be found more beneficial for procuring health and long life than any solution of myrrh whatsoever.

50 Certainly divers resins and gums may have virtues, and yet not be able for their grossness to pass the lacteals and other finer vessels, nor yet, perhaps, readily impart those virtues to a menstruum that may with safety and speed convey them throughout the human body. Upon all which accounts, I believe tar-water will be found to have singular advantages. It is observed that acid spirits prove the stronger, by how much the greater degree of heat is required to raise them. And indeed there seemeth to be no acid more gentle than this obtained by the simple affusion of cold water, which carries off from the subject the most light and subtle parts, and, if one may so speak, the very flower of its specific qualities. And here it is to be noted that the volatile salt and spirit of vegetables do, by gently stimulating the solids, attenuate the fluids contained in them, and promote secretions, and that they are penetrating and active, contrary to the general nature of other acids.

51 It is a great maxim for health that the juices of the body be kept fluid in a due proportion. Therefore, the acid volatile spirit in tar-water, at once attenuating and cooling in a moderate degree, must greatly conduce to health, as a mild salutary deobstruent, quickening the circulation of the fluids without wounding the solids, thereby gently removing or preventing those obstructions which are the great and general cause of most chronical diseases; in this manner answering to the antihysterics, *assafoetida*, *galbanum*, myrrh, amber, and, in general, to all the resins and gums of trees or shrubs useful in nervous cases.

52 Warm water is itself a deobstruent. Therefore the

[1] [*Elementa chemiae*, 1732 ed., VOL. II, p. 231.—Ed.] [2] [According to Pliny, *Hist. nat.*, XVI, 21.—Ed.]

infusion of tar drunk warm is easier insinuated into all the nice capillary vessels, and acts not only by virtue of the balsam, but also by that of the vehicle. Its taste, its diuretic quality, its being so great a cordial, shew the activity of this medicine. And, at the same time that it quickens the sluggish blood of the hysterical, its balsamic oily nature abates the too rapid motion of the sharp thin blood in those who are hectic. There is a lentor and smoothness in the blood of healthy strong people; on the contrary, there is often an acrimony and solution in that of weakly morbid persons. The fine particles of tar are not only warm and active, they are also balsamic and emollient, softening and enriching the sharp and vapid blood, and healing the erosions occasioned thereby in the blood-vessels and glands.

53 Tar-water possesseth the stomachic and cardiac qualities of *Elixir proprietatis*, Stoughton's drops,[1] and many such tinctures and extracts; with this difference, that it worketh its effect more safely, as it hath nothing of that spirit of wine, which, however mixed and disguised, may yet be well accounted a poison in some degree.

54 Such medicines are supposed to be diaphoretic which, being of an active and subtle nature, pass through the whole system, and work their effect in the finest capillaries and perspiratory ducts, which they gently cleanse and open. Tar-water is extremely well fitted to work by such an insensible diaphoresis, by the fineness and activity of its acid volatile spirit. And surely those parts ought to be very fine, which can scour the perspiratory ducts, under the scarf-skin or cuticle, if it be true that one grain of sand would cover the mouths of more than a hundred thousand.

55 Another way wherein tar-water operates is by urine, than which perhaps none is more safe and effectual for cleansing the blood and carrying off its salts. But it seems to produce its principal effect as an alterative, sure and easy, much safer than those vehement, purgative, emetic, and salivating medicines which do violence to nature.

56 An obstruction of some vessels causeth the blood to move more swiftly in other vessels which are not obstructed. Hence manifold disorders. A liquor that dilutes and attenuates resolves the concretions which obstruct. Tar-water is such a liquor. It may be said, indeed, of common water, that it attenuates; also of mercurial preparations, that they

1 [Stoughton's 'great cordial elixir,' patented in 1712.—Ed.]

attenuate. But it should be considered that mere water only distends the vessels, and thereby weakens their tone; and that mercury by its great momentum may justly be suspected of hurting the fine capillaries; which two deobstruents therefore might easily overact their parts, and (by lessening the force of the elastic vessels) remotely produce those concretions they are intended to remove.[1]

57 Weak and rigid fibres are looked on by the most able physicians as sources of two different classes of distempers: a sluggish motion of the liquids occasions weak fibres: therefore tar-water is good to strengthen them, as it gently accelerates their contents. On the other hand, being an unctuous, bland fluid, it moistens and softens the dry and stiff fibres, and so proves a remedy for both extremes.

58 Common soaps are compositions of lixivial[2] salt and oil. The corrosive acrimony of the saline particles being softened by the mixture of an unctuous substance, they insinuate themselves into the small ducts with less difficulty and danger. The combination of these different substances makes up a very subtle and active medicine, fitted for mixing with all humours, and resolving all obstructions. Soap, therefore, is justly esteemed a most efficacious medicine in many distempers. Alkaline soap is allowed to be cleansing, attenuating, opening, resolving, sweetening; it is pectoral, vulnerary, diuretic, and hath other good qualities which are also to be found in tar-water. It is granted that oil and acid salts combined together exist in vegetables, and that consequently there are acid soaps as well as alkaline. And the saponaceous nature of the acid vegetable spirits is what renders them so diuretic, sudorific, penetrating, abstersive, and resolving. Such, for instance, is the acid spirit of *guaiacum*. And all these same virtues seem to be in tar-water in a mild and salutary degree.

59 It is the general opinion that all acids coagulate the blood. Boerhaave[3] excepts vinegar, which he holds to be a soap, inasmuch as it is found to contain an oil as well as an acid spirit. Hence it is both unctuous and penetrating, a powerful antiphlogistic, and preservative against corruption and infection. Now it seems evident that tar-water is a soap as well as vinegar. For, though it be the character of resin, which is an inspissated gross oil, not to dissolve in water (Sect. 47), yet

[1] [On mercury see also Sects. 71 and 100.—Ed.] [2] [See Sect. 122 and note on Sect. 8.—Ed.] [3] [*Elementa chemiae* (1732), VOL. II, p. 218 (cp. p. 260).—Ed.]

the salts attract some fine particles of essential oil, which fine oil serves as a vehicle for the acid salts, and shews itself in the colour of the tar-water, for all pure salts are colourless. And though the resin will not dissolve in water, yet the subtle oil, in which the vegetable salts are lodged, may as well mix with water as vinegar doth, which contains both oil and salt. And as the oil in tar-water discovers itself to the eye, so the acid salts do manifest themselves to the taste. Tar-water therefore is a soap, and as such hath the medicinal qualities of soaps.

60 It operates more gently as the acid salts lose their acrimony, being sheathed in oil, and, thereby approaching the nature of neutral salts, are more benign and friendly to the animal system; and more effectually as, by the help of a volatile, smooth, insinuating oil, those same salts are more easily introduced into the capillary ducts. Therefore, in fevers and epidemical distempers it is (and I have found it so), as well as in chronical diseases, a most safe and efficacious medicine, being good against too great fluidity as a balsamic, and good against viscidity as a soap. There is something in the fiery corrosive nature of lixivial salts which makes alkaline soap a dangerous remedy in all cases where an inflammation is apprehended. And as inflammations are often occasioned by obstructions, it should seem an acid soap was much the safer deobstruent.

61 Even the best turpentines, however famous for their vulnerary and detergent qualities, have yet been observed by their warmth to dispose to inflammatory tumours. But the acid spirit (Sects. 7, 8), being in so great proportion in tar-water, renders it a cooler and safer medicine. And the aethereal oil of turpentine, though an admirable dryer, healer, and anodyne, when outwardly applied to wounds and ulcers, and not less useful in cleansing the urinary passages and healing their ulcerations, yet is known to be of a nature so very relaxing as sometimes to do much mischief when taken inwardly. Tar-water is not attended with the same ill effects, which I believe are owing in a great measure to the æthereal oils being deprived of the acid spirit in distillation, which, vellicating and contracting as a stimulus, might have proved a counterpoise to the excessive lubricating and relaxing qualities of the oil.

62 Woods in decoction do not seem to yield so ripe and elaborate a juice as that which is deposited in the cells or *loculi*

l 34 *when taken inwardly* (*not in A, B, C, D*).

terebinthiaci, and spontaneously oozes from them. And indeed, though the balsam of Peru, obtained by boiling wood and scumming the decoction, be a very valuable medicine, and of great account in divers cases, particularly asthmas, nephritic pains, nervous colics, and obstructions, yet I do verily think (and I do not say this without experience) that tar-water is a more efficacious remedy in all those cases than even that costly drug.

63 It hath been already observed that the restorative pectoral antihysterical virtues of the most precious balsams and gums are possessed in a high degree by tar-water (Sects. 9, 21, 22, 23). And I do not know any purpose answered by the wood-drinks for which tar-water may not be used with at least equal success. It contains the virtues even of *guaiacum*, which seems the most efficacious of all the woods, warming and sweetening the humours, diaphoretic and useful in gouts, dropsies and rheums, as well as in the foul disease. Nor should it seem strange if the virtues obtained by boiling an old dry wood prove inferior to those extracted from a balsam.

64 There is a fine volatile spirit in the waters of Geronster, the most esteemed of all the fountains about Spa,[1] but whose waters do not bear transporting. The stomachic, cardiac, and diuretic qualities of this fountain somewhat resemble those of tar-water, which, if I am not greatly mistaken, contains the virtues of the best chalybeate and sulphureous waters; with this difference, that those waters are apt to affect the head in taking, which tar-water is not. Besides, there is a regimen of diet to be observed, especially with chalybeate waters, which I never found necessary with this. Tar-water layeth under no restraint either as to diet, hours, or employment. A man may study, or exercise, or repose, keep his own hours, pass his time either within or without, and take wholesome nourishment of any kind.

65 The use of chalybeate waters, however excellent for the nerves and stomach, is often suspended by colds and inflammatory disorders, in which they are acknowledged to be very dangerous; whereas tar-water is so far from hurting in those cases, or being discontinued on that account, that it greatly contributes to their cure (Sect. 7).

66 Cordials, vulgarly so called, act immediately on the stomach and by consent of nerves on the head. But medicines

l 32 *chalybeate—(A corrigenda, B, E) mineral.*

[1] [The springs of Spa (near Liége) began to be famous in the sixteenth century. —Ed.]

of an operation too fine and light to produce a sensible effect in the *primae viae* may, nevertheless, in their passage through the capillaries, operate on the sides of those small vessels in such manner as to quicken their oscillations, and consequently the motion of their contents, producing, in issue and effect, all the benefits of a cordial much more lasting and salutary than those of distilled spirits, which by their caustic and coagulating qualities do incomparably more mischief than good. Such a cardiac medicine is tar-water. The transient fits of mirth, produced from fermented liquors and distilled spirits, are attended with proportionable depressions of spirits in their intervals. But the calm cheerfulness arising from this water of health (as it may be justly called) is permanent. In which it emulates the virtues of that famous plant Gen Seng,[1] so much valued in China as the only cordial that raiseth the spirits without depressing them. Tar-water is so far from hurting the nerves, as common cordials do, that it is highly useful in cramps, spasms of the viscera, and paralytic numbness.

67 Emetics are on certain occasions administered with great success. But the overstraining and weakening of nature may be very justly apprehended from a course of emetics. They are nevertheless prescribed and substituted for exercise. But it is well remarked in Plato's *Timaeus*[2] that vomits and purges are the worst exercise in the world. There is something in the mild operation of tar-water that seems more friendly to the economy, and forwards the digestions and secretions in a way more natural and benign; the mildness of this medicine being such that I have known children take it for above six months together with great benefit, and without any inconvenience; and, after long and repeated experience, I do esteem it a most excellent diet-drink, fitted to all seasons and ages.

68 It is I think allowed that the origin of the gout lies in a faulty digestion. And it is remarked by the ablest physicians that the gout is so difficult to cure because heating medicines aggravate its immediate, and cooling its remote cause. But tar-water, although it contain active principles that strengthen the digestion beyond anything I know, and consequently must be highly useful, either to prevent or lessen the following fit,

l 2 *passage—(A, B) passages.* *l* 7 *distilled—(A, B, C) fermented.* *l* 10 *and distilled spirits (not in A, B, C).* *l* 36 *contain—(E) contains.*

[1] [*Panax Ginseng*, the aromatic root of which is still much used in China. —Ed.] [2] [89.—Ed.]

or by invigorating the blood to cast it upon the extremities, yet it is not of so heating a nature as to do harm even in the fit. Nothing is more difficult or disagreeable than to argue men out of their prejudices; I shall not therefore enter into controversies on this subject, but, if men dispute and object, shall leave the decision to time and trial.

69 In the modern practice, soap, opium and mercury bid fairest for Universal Medicines. The first of these is highly spoken of. But then, those who magnify it most except against the use of it in such cases where the obstruction is attended with a putrefactive alkali, or where an inflammatory disposition appears. It is acknowledged to be very dangerous in a phthisis, fever, and some other cases in which tar-water is not only safe but useful.

70 Opium, though a medicine of great extent and efficacy, yet is frequently known to produce grievous disorders in hysterical or hypochondriacal persons, who make a great part, perhaps the greatest, of those who lead sedentary lives in these islands. Besides, upon all constitutions dangerous errors may be committed in the use of opium.

71 Mercury hath of late years become a medicine of very general use,[1] the extreme minuteness, mobility, and momentum of its parts rendering it a most powerful cleanser of all obstructions, even in the most minute capillaries. But then we should be cautious in the use of it, if we consider that the very thing which gives it power of doing good above other deobstruents doth also dispose it to do mischief. I mean its great momentum, the weight of it being about ten times that of blood, and the momentum being the joint product of the weight and velocity, it must needs operate with great force; and may it not be justly feared that so great a force, entering the minutest vessels, and breaking the obstructed matter, might also break or wound the fine tender coats of those small vessels, and so bring on the untimely effects of old age, producing more, perhaps, and worse obstructions than those it removed? Similar consequences may justly be apprehended from other mineral and ponderous medicines. Therefore, upon the whole, there will not perhaps be found any medicine more general in its use, or more salutary in its effects, than tar-water.

72 To suppose that all distempers, arising from very different

[1] [Boerhaave (*El. chem.*, VOL. II, p. 483) had sanctioned this remedy of the alchemists.—Ed.]

and it may be from contrary causes, can be cured by one and the same medicine must seem chimerical.[1] But it may with truth be affirmed that the virtue of tar-water extends to a surprising variety of cases very distant and unlike (Sects. 3, 4, 5, 6, 21, etc.). This I have experienced in my neighbours, my family, and myself. And as I live in a remote corner, among poor neighbours, who for want of a regular physician have often recourse to me, I have had frequent opportunities of trial, which convince me it is of so just a temperament as to be an enemy to all extremes. I have known it do great good in a cold, watery constitution, as a cardiac and stomachic, and at the same time allay heat and feverish thirst in another. I have known it correct costive habits in some, and the contrary habit in others. Nor will this seem incredible if it be considered that middle qualities naturally reduce the extreme. Warm water, for instance, mixed with hot and cold, will lessen the heat in that, and the cold in this.

73 They who know the great virtues of common soap, whose coarse lixivial salts are the product of culinary fire, will not think it incredible that virtues of mighty force and extent should be found in a fine acid soap (Sect. 58), the salts and oil whereof are a most elaborate product of nature and the solar light.

74 It is certain tar-water warms, and therefore some may perhaps still think it cannot cool. The more effectually to remove this prejudice, let it be farther considered that as, on the one hand, opposite causes do sometimes produce the same effect—for instance, heat by rarefaction and cold by condensation do both increase the air's elasticity—so, on the other hand, the same cause shall sometime produce opposite effects: heat for instance thins, and again heat coagulates the blood. It is not therefore strange that tar-water should warm one habit and cool another, have one good effect on a cold constitution, and another good effect on an inflamed one; nor, if this be so, that it should cure opposite disorders. All which justifies to reason what I have found true in fact. The salts, the spirits, the heat of tar-water are of a temperature congenial to the constitution of a man, which receives from it a kindly warmth, but

l 31 *thins . . . coagulates—(A, B) in one degree thins, and in another coagulates.*

[1] [In his First *Letter to Prior*, Sects. 11 and 22 (below, pp. 175 and 179), Berkeley *suspects* tar-water to be a panacea, *i.e.* curing all diseases, not all men (which 'consists not with mortality'). See also *Siris*, Sect. 87.—Ed.]

no inflaming heat. It was remarkable that two children in my neighbourhood, being in a course of tar-water, upon an intermission of it never failed to have their issues inflamed by a humour much more hot and sharp than at other times. But its great use in the small-pox, pleurisies, and fevers is a sufficient proof that tar-water is not of an inflaming nature.

75 I have dwelt the longer on this head because some gentlemen of the Faculty have thought fit to declare that tar-water must inflame, and that they would never visit any patient in a fever who had been a drinker of it. But I will venture to affirm that it is so far from increasing a feverish inflammation that it is on the contrary a most ready means to allay and extinguish it. It is of admirable use in fevers, being at the same time the surest, safest and most effectual both paregoric and cordial; for the truth of which I appeal to any person's experience who shall take a large draught of it milk-warm in the paroxysm of a fever, even when plain water or herb-teas shall be found to have little or no effect. To me it seems that its singular and surprising use in fevers of all kinds, were there nothing else, would be alone sufficient to recommend it to the public.

76 The best physicians make the idea of a fever to consist in a too great velocity of the heart's motion, and too great resistance at the capillaries. Tar-water, as it softens and gently stimulates those nice vessels, helps to propel their contents, and so contributes to remove the latter part of the disorder. And for the former, the irritating acrimony which accelerates the motion of the heart is diluted by watery, corrected by acid, and softened by balsamic remedies, all which intentions[1] are answered by this aqueous, acid, balsamic medicine. Besides, the viscid juices coagulated by the febrile heat are resolved by tar-water as a soap, and not too far resolved, as it is a gentle acid soap; to which we may add that the peccant humours and salts are carried off by its diaphoretic and diuretic qualities.

77 I found all this confirmed by my own experience in the late sickly season of the year one thousand seven hundred and forty-one,[2] having had twenty-five fevers in my own family cured by this medicinal water, drunk copiously. The same

[1] [See note on Sect. 20.—Ed.] [2] [A phase of a famine that began in 1739. See Lecky's *History of Ireland in the Eighteenth Century*, ch. 2 (1892 ed., VOL. I, p. 186). In a letter of 19 May 1741 Berkeley writes : 'The havoc of mankind in the counties of Cork, Limerick and some adjacent places hath been incredible. The nation probably will not recover this loss in a century.'—Ed.]

method was practised on several of my poor neighbours with equal success. It suddenly calmed the feverish anxieties, and seemed every glass to refresh, and infuse life and spirit into the patient. At first some of those patients had been vomited, but afterwards I found that without vomiting, bleeding, blistering, or any other evacuation or medicine whatever, very bad fevers could be cured by the sole drinking of tar-water, milk-warm, and in good quantity, perhaps a large glass every hour or oftener, taken in bed. And it was remarkable that such as were cured by this comfortable cordial recovered health and spirits at once, while those who had been cured by evacuations often languished long, even after the fever had left them, before they could recover of their medicines and regain their strength.

78 In peripneumonies and pleurisies I have observed tar-water to be excellent, having known some pleuritic persons cured without bleeding, by a blister early applied to the stitch, and the copious drinking of tar-water, four or five quarts, or even more, in four-and-twenty-hours. And I do recommend it to farther trial, whether in all cases of a pleurisy one moderate bleeding, a blister on the spot, and plenty of tepid tar-water may not suffice, without those repeated and immoderate bleedings, the bad effects of which are perhaps never got over. I do even suspect that a pleuritic patient betaking himself to bed betimes, and drinking very copiously of tar-water, may be cured by that alone, without bleeding, blistering, or any other medicine whatever; certainly I have found this succeed at a glass every half-hour.

79 I have known a bloody flux of long continuance, after divers medicines had been tried in vain, cured by tar-water. But that which I take to be the most speedy and effectual remedy in a bloody flux is a clyster[1] of an ounce of common brown rosin dissolved over a fire in two ounces of oil, and added to a pint of broth, which not long since I had frequent occasion of trying when that distemper was epidemical. Nor can I say that any to whom I advised it miscarried. This experiment I was led to make by the opinion I had of tar as a balsamic; and rosin is only tar inspissated.

80 Nothing that I know corroborates the stomach so much as tar-water (Sect. 68). Whence it follows that it must be of

l 9 *or oftener* (*not in A, B, C, D*).

[1] [An enema. Berkeley mentions several cures of dysentery in a letter of 8 February 1741 to Prior.—Ed.]

singular use to persons afflicted with the gout. And, from what I have observed in five or six instances, I do verily believe it the best and safest medicine either to prevent the gout, or so to strengthen nature against the fit as to drive it from the vitals; or at other times to change a worse illness into the gout, and so get rid of it. Dr. Sydenham, in his treatise *Of the Gout*,[1] declares that whoever finds a medicine the most efficacious for strengthening digestion will do more service in the cure of that and other chronical distempers than he can even form a notion of. And I leave it to trial, whether tar-water be not that medicine, as I myself am persuaded it is, by all the experiments I could make. But in all trials I would recommend discretion; for instance, a man with the gout in his stomach ought not to drink cold tar-water. This Essay leaves room for future experiment in every part of it, not pretending to be a complete treatise.

81 It is evident to sense that blood, urine, and other animal juices, being let to stand, soon contract a great acrimony. Juices, therefore, from a bad digestion, retained and stagnating in the body, grow sharp and putrid. Hence a fermenting heat, the immediate cause of the gout. The curing this by cooling medicines, as they would increase the antecedent cause, must be a vain attempt. On the other hand, spices and spirituous liquors, while they contribute to remove the antecedent cause or bad digestion, would, by inflaming the blood, increase the proximate or immediate cause of the gout, to wit, the fermenting heat. The scope therefore must be, to find a medicine that shall corroborate but not inflame. Bitter herbs are recommended; but they are weak in comparison of tar-water.

82 The great force of tar-water to correct the acrimony of the blood appears in nothing more than in the cure of a gangrene from an internal cause, which was performed on a servant of my own, by prescribing the copious and constant use of tar-water for a few weeks. From my representing tar-water as good for so many things, some perhaps may conclude it is good for nothing. But charity obligeth me to say what I know, and what I think, howsoever it may be taken. Men may censure and object as they please, but I appeal to

l 5 *or . . . rid of it* (*not in A, B, E*). *l* 5 *so get*—(*C, D*) *to get.*

[1] [*Tractatus de Podagra et Hydrope*, 1683, London, by Thomas Sydenham (1624–89), friend of Locke, and one of our most famous physicians. Berkeley mentions his own first fit of gout in a letter of 19 February 1734 to Prior. Cp. note on Sect. 119.—Ed.]

time and experiment. Effects misimputed, cases wrong told, circumstances overlooked, perhaps, too, prejudices and partialities against truth, may for a time prevail, and keep her at the bottom of her well, from whence nevertheless she emergeth sooner or later, and strikes the eyes of all who do not keep them shut.

83 Boerhaave [1] thinks a specific may be found for that peculiar venom which infects the blood in the small-pox, and that the prospect of so great a public benefit should stir up men to search for it. Its wonderful successes in preventing and mitigating that distemper (Sects. 2, 3) would incline one to suspect that tar-water is such a specific, especially since I have found it of sovereign use as well during the small-pox as before it. Some think an erysipelas and the plague differ only in degree. If so, tar-water should be useful in the plague,[2] for I have known it cure an erysipelas.

84 Tar-water, as cleansing, healing, and balsamic, is good in all disorders of the urinary passages, whether obstructed or ulcerated. Dr. Lister [3] supposeth, indeed, that turpentines act by a caustic quality, which irritates the coats of the urinary ducts to expel sand or gravel. But it should seem this expelling diuretic virtue consisted rather in the salts than the resin, and consequently resides in the tar-water, gently stimulating by its salts, without the dangerous force of a caustic. The violent operation of ipecacuanha lies in its resin, but the saline extract is a gentle purge and diuretic, by the stimulus of its salts.

85 That which acts as a mild cordial (Sect. 66), neither hurting the capillary vessels as a caustic, nor affecting the nerves, nor coagulating the juices, must in all cases be a friend to nature, and assist the *vis vitæ* in its struggle against all kinds of contagion. And from what I have observed, tar-water appears to me a useful preservative in all epidemical disorders, and against all other infection whatsoever, as well as that of the small-pox. What effects the *animi pathemata* have in human maladies is well known, and consequently the general benefit of such a cardiac may be reasonably supposed.

l 11 *especially . . . before it (not in A, B).* *l* 35 *may be reasonably supposed—(A, B) cannot be doubted.*

[1] [*Aphorismi de cognoscendis et curandis morbis* (1709, Leyden ; Eng. trans. 1715 and 1735), aph. 1390, 1391. Berkeley writes more on smallpox below, p. 209.—Ed.] [2] [See third *Letter to Prior* (below, p. 190).—Ed.] [3] [Martin Lister (*c.* 1638–1712), physician and naturalist. His contributions to the *Philos. Transactions* extend from no. 25 to no. 585.—Ed.]

86 As the body is said to clothe the soul, so the nerves may be said to constitute her inner garment. And as the soul animates the whole, what nearly touches the soul relates to all. Therefore the asperity of tartarous salts, and the fiery acrimony of alkaline salts, irritating and wounding the nerves, produce nascent passions and anxieties in the soul; which both aggravate distempers and render men's lives restless and wretched, even when they are afflicted with no apparent distemper. This is the latent spring of much woe, spleen, and *tædium vitæ*. Small imperceptible irritations of the minutest fibres or filaments, caused by the pungent salts of wines and sauces, do so shake and disturb the microcosms [1] of high livers as often to raise tempests in courts and senates; whereas the gentle vibrations that are raised in the nerves by a fine subtle acid sheathed in a smooth volatile oil (Sects. 59, 61), softly stimulating and bracing the nervous vessels and fibres, promotes a due circulation and secretion of the animal juices, and creates a calm satisfied sense of health. And, accordingly, I have often known tar-water procure sleep and compose the spirits in cruel vigils occasioned either by sickness or by too intense application of mind.

87. In diseases sometimes accidents happen from without by mismanagement, sometimes latent causes operate within, jointly with the specific taint or peculiar cause of the malady. The causes of distempers are often complicated, and there may be something in the idiosyncrasy of the patient that puzzles the physician. It may therefore be presumed that no medicine is infallible, not even in any one disorder. But as tar-water possesseth the virtues of fortifying the stomach, as well as purifying and invigorating the blood, beyond any medicine that I know, it may be presumed of great and general efficacy in all those numerous illnesses which take their rise from foul or vapid blood, or from a bad digestion. The animal spirits [2] are elaborated from the blood. Such therefore as the blood is, such will be the animal spirit, more or less, weaker or stronger. This sheweth the usefulness of tar-water in all hysteric and hypochondriac cases, which, together with the maladies from indigestion, comprise almost the whole tribe of chronical diseases.

[1] [See note on Sect. 145.—Ed.] [2] [The notion of animal spirits (bodily, not mental) goes back to the physiology of the Stoics (πνεῦμα). Descartes used it, and many of Berkeley's contemporaries. The spirit was located in the nerves (cp. Sect. 166 *ad fin.*).—Ed.]

88 The scurvy may be reckoned in these climates a universal malady, as people in general are subject to it, and as it mixes more or less in almost all diseases. Whether this proceeds from want of elasticity in our air, upon which the tone of the vessels depends, and upon that the several secretions; or whether it proceeds from the moisture of our climate, or the grossness of our food, or the salts in our atmosphere, or from all these together —thus much at least seems not absurd to suppose, that as physicians in Spain and Italy are apt to suspect the venereal taint to be a latent principle, and bear a part in every illness, so, for as good reason, the scurvy should be considered by our physicians as having some share in most disorders and constitutions that fall in their way. It is certain our perspiration is not so free as in clearer air and warmer climates. Perspirable humours not discharged will stagnate and putrefy. A diet of animal food will be apt to render the juices of our bodies alkalescent. Hence ichorous and corrosive humours and many disorders. Moist air makes viscid blood, and saline air inflames this viscid blood. Hence broken capillaries, extravasated blood, spots, and ulcers, and other scorbutic symptoms. The body of a man attracts and imbibes the moisture and salts of the air and whatever floats in the atmosphere, which as it is common to all, so it affects all more or less.

89 Doctor Musgrave[1] thinks the Devonshire scurvy a relic of the leprosy, and that it is not owing to the qualities of the air. But as these insulars in general live in a gross saline air, and their vessels being less elastic are consequently less able to subdue and cast off what their bodies as sponges draw in, one would be tempted to suspect the air not a little concerned, especially in such a situation as that of Devonshire. In all these British islands we enjoy a great mediocrity of climate, the effect whereof is that we have neither heat enough to exalt and dissipate the gross vapours, as in Italy, nor cold enough to condense and precipitate them, as in Sweden. So they are left floating in the air, which we constantly breathe, and imbibe through the whole surface of our bodies. And this, together with exhalations from coal fires, and the various fossils wherein we abound, doth greatly contribute to render us scorbutic and hypochondriac.

90 There are some who derive all diseases from the scurvy, which indeed must be allowed to create or mimic most other

[1] [William Musgrave (*c.* 1655–1721), physician, and Secretary to the Royal Society in 1685. *De arthritide symptomatica dissertatio*, 1703, ch. 6.—Ed.]

maladies. Boerhaave[1] tells us it produceth pleuritic, colic, nephritic, hepatic pains, various fevers, hot, malignant, intermitting dysenteries, faintings, anxieties, dropsies, consumptions, convulsions, palsies, fluxes of blood. In a word, it may be said to contain the seeds and origin of almost all distempers. Insomuch that a medicine which cures all sorts of scurvy may be presumed good for most other maladies.

91 The scurvy doth not only in variety of symptoms imitate most distempers, but also, when come to a height, in degree of virulence equal the most malignant. Of this we have a remarkable proof in that horrible description of the scorbutic patients in the hospitals of Paris, given by Monsieur Poupart, in the Memoirs of the Royal Academy of Sciences for the year one thousand, six hundred and ninety-nine.[2] That author thinks he saw some resemblance in it to the plague of Athens. It is hard to imagine anything more dreadful than the case of those men, rotting alive by the scurvy in its supreme degree. To obviate such putrefaction, I believe the most effectual method would be to embalm (if one may so say) the living body with tar-water copiously drunk; and this belief is not without experience.

92 It is the received opinion that the animal salts of a sound body are of a neutral, bland, and benign nature; that is, the salts in the juices past the *primæ viæ* are neither acid nor alkaline, having been subdued by the constitution, and changed into a third nature.[3] Where the constitution wants force to do this, the aliment is not duly assimilated: and so far as the salts retain their pristine qualities, sickly symptoms ensue, acids and alkalies not perfectly subdued producing weak ferments in the juices. Hence scurvy, cachexy, and a long train of ills.

93 A cachexy or ill habit is much of the same kind with the scurvy, proceeds from the same causes, and is attended with like symptoms, which are so manifold and various that the scurvy may well be looked on as a general cachexy, infecting the whole habit, and vitiating all the digestions. Some have reckoned as

[1] [*Aphorismi de cognoscendis et curandis morbis*, under 'Scorbutus' (4th edn., 1728, Leyden, pp. 280f.—Ed.] [2] [François Poupart (1661–1709), French anatomist and physicist. His paper in the *Mémoires de l'Académie* (Nov. 1699, pp. 169–76) was reprinted in the *Philosophical Transactions*, London, no. 318 (1708). The plague at Athens was in 430 B.C. ; see Thucydides, II, 7.—Ed.] [3] [The view enunciated by Sylvius (François de la Boë, 1614–72), famous medical teacher at Leyden; supported in England by Thomas Willis (mentioned in Sect. 205).—Ed.]

many sorts of the scurvy as there are different taints of the blood. Others have supposed it a collection of all illnesses together. Some suppose it an accumulation of several diseases *in fieri.* Others take it for an assemblage of the relics of old distempers.

94 But thus much is certain, the cure of the scurvy is no more to be attempted by strongly active medicines than (to use the similitude of an ingenious writer) a thorn in the flesh, or pitch on silk, to be removed by force. The viscid humour must be gently resolved and diluted, the tone of the vessels recovered by a moderate stimulation, and the tender fibres and capillary vessels gradually cleared from the concreted stuff that adheres and obstructs them. All which is in the aptest manner performed by a watery diluent, containing a fine vegetable soap. And although a complete cure by alteratives, operating on the small capillaries, and by insensible discharges, must require length of time, yet the good effect of this medicine on cachectic and scorbutic persons is soon perceived, by the change it produceth in their pale discoloured looks, giving a florid healthy countenance in less time than perhaps any other medicine.

95 It is supposed by physicians that the immediate cause of the scurvy lies in the blood, the fibrous part of which is too thick and the serum too thin and sharp; and that hence ariseth the great difficulty in the cure, because in the correcting of one part regard must be had to the other. It is well known how extremely difficult it is to cure an inveterate scurvy: how many scorbutic patients have grown worse by an injudicious course of evacuations; how many are even rendered incurable by the treatment of inconsiderate physicians; and how difficult, tedious and uncertain the cure is in the hands even of the best, who are obliged to use such variety and change of medicines in the different stages of that malady: which nevertheless may be cured (if I may judge by what I have experienced) by the sole, regular, constant, copious use of tar-water.

96 Tar-water moderately inspissates with its balsamic virtue, and renders mild the thin and sharp part of the blood. The same, as a soapy medicine, dissolves the grumous concretions of the fibrous part. As a balsam it destroys the ulcerous acrimony of the humours, and as a deobstruent it opens and cleans the vessels, restores their tone, and strengthens the digestion, whose defects are the principal cause of scurvy and cachexy.

97 In the cure of the scurvy the principal aim is to subdue the acrimony of the blood and juices. But as this acrimony proceeds from different causes, or even opposite, as acid and alkaline, what is good in one sort of scurvy proves dangerous or even mortal in another. It is well known that hot antiscorbutics, where the juices of the body are alkalescent, increase the disease. And sour fruits and vegetables produce a like effect in the scurvy, caused by an acid acrimony. Hence fatal blunders are committed by unwary practitioners, who, not distinguishing the nature of the disease, do frequently aggravate instead of curing it. If I may trust what trials I have been able to make, this water is good in the several kinds of scurvy, acid, alkaline, and muriatic, and I believe it the only medicine that cures them all without doing hurt in any. As it contains a volatile acid (Sect. 7) with a fine volatile oil, why may not a medicine cool in one part and warm in another be a remedy to either extreme (Sect. 72)? I have observed it to produce a kindly genial warmth without heat, a thing to be aimed at in all sorts of scurvy. Besides, the balsam in tar-water sheathes all scorbutic salts alike: and its great virtues as a digester and deobstruent are of general use in all scorbutic, and, I may add, in all chronic cases whatsoever.

98 I cannot be sure that I have tried it in a scrofulous case, though I have tried it successfully in one that I suspected to be so. And I apprehend it would be very serviceable in such disorders. For although Dr. Gibbs in his treatise of the king's evil[1] derives that disease from a coagulating acid, which is also agreeable to the opinion of some other physicians, and although tar-water contains an acid, yet, as it is a soap (Sect. 58), it resolves instead of coagulating the juices of the body.

99 For hysterical and hypochondriacal disorders so frequent among us, it is commonly supposed that all acids are bad. But I will venture to except the acid soap of tar-water, having found, by my own experience and that of many others, that it raiseth the spirits, and is an excellent antihysteric, nor less innocent than potent, which cannot be said of those others in common use, that often leave people worse than they found them.

100 In a high degree of scurvy a mercurial salivation is looked on by many as the only cure; which, by the vehement

l 25 *of*—(*E*) *on.*

[1] [*Observations of various eminent cures of Scrophulous Distempers, commonly called the King's Evil*, London, 1712, by James Gibbs (d. 1724).—Ed.]

shock it gives the whole frame, and the sensible secretion it produceth, may be thought to be more adequate to such an effect. But the disorder occasioned by that violent process, it is to be feared, may never be got over. The immediate danger, the frequent bad effects, the extreme trouble and nice care attending such a course, do very deservedly make people afraid of it. And though the sensible secretion therein be so great, yet in a longer tract of time the use of tar-water may produce as great a discharge of scorbutic salts by urine and by perspiration, the effect of which last, though not so sensible, may yet be greater than that of salivation, especially if it be true that in common life insensible perspiration is to nutrition, and all sensible excretions, as five to three.

101 Many hysteric and scorbutic ailments, many taints contracted by themselves, or inherited from their ancestors, afflict the people of condition in these islands, often rendering them, upon the whole, much more unhappy than those whom poverty and labour have ranked in the lowest lot of life; which ailments might be safely removed or relieved by the sole use of tar-water, and those lives which seem hardly worth living for bad appetite, low spirits, restless nights, wasting pains and anxieties, be rendered easy and comfortable.

102 As the nerves are instruments of sensation, it follows that spasms in the nerves may produce all symptoms, and therefore a disorder in the nervous system shall imitate all distempers, and occasion, in appearance, an asthma for instance, a pleurisy, or a fit of the stone. Now, whatever is good for the nerves in general is good against all such symptoms. But tar-water, as it includes in an eminent degree the virtues of warm gums and resins, is of great use for comforting and strengthening the nerves (Sect. 86), curing twitches in the nervous fibres, cramps also, and numbness in the limbs, removing anxieties, and promoting sleep; in all which cases I have known it very successful.

103 This safe and cheap medicine suits all circumstances and all constitutions, operating easily, curing without disturbing, raising the spirits without depressing them, a circumstance that deserves repeated attention, especially in these climates, where strong liquors so fatally and so frequently produce those very distresses they are designed to remedy; and, if I am not misinformed, even among the ladies themselves, who are truly much to be pitied. Their condition of life makes them a prey to

l 19 *might*—(*B*) *may*.

imaginary woes, which never fail to grow up in minds unexercised and unemployed. To get rid of these, it is said, there are who betake themselves to distilled spirits. And it is not improbable they are led gradually to the use of those poisons by a certain complaisant pharmacy, too much used in the modern practice, palsy drops, poppy cordial, plague water, and such like, which being in truth nothing but drams disguised, yet, coming from the apothecaries, are considered only as medicines.

104 The soul of man was supposed by many ancient sages to be thrust into the human body as into a prison, for punishment of past offences.[1] But the worst prison is the body of an indolent epicure, whose blood is inflamed by fermented liquors (Sect. 66) and high sauces, or rendered putrid, sharp and corrosive by a stagnation of the animal juices through sloth and indolence; whose membranes are irritated by pungent salts; whose mind is agitated by painful oscillations of the nervous system (Sect. 86); and whose nerves are mutually affected by the irregular passions of his mind. This ferment in the animal economy darkens and confounds the intellect. It produceth vain terrors and vain conceits, and stimulates the soul with mad desires, which, not being natural, nothing in nature can satisfy. No wonder, therefore, there are so many fine persons of both sexes, shining themselves, and shone on by fortune, who are inwardly miserable and sick of life.

105 The hardness of stubbed vulgar constitutions renders them insensible of a thousand things that fret and gall those delicate people who, as if their skin was peeled off, feel to the quick everything that touches them. The remedy for this exquisite and painful sensibility is commonly sought from fermented, perhaps from distilled, liquors, which render many lives wretched that would otherwise have been only ridiculous. The tender nerves and low spirits of such poor creatures would be much relieved by the use of tar-water, which might prolong and cheer their lives. I do therefore recommend to them the use of a cordial, not only safe and innocent, but giving health and spirit as surely as other cordials destroy them.

106 I do verily think there is not any other medicine whatsoever so effectual to restore a crazy constitution, and cheer a dreary mind, or so likely to subvert that gloomy empire of the

[1] [An Orphic notion (σῶμα σῆμα). Cp. frag. 14 of Philolaus in Diels, *Fragmente der Vorsokratiker* (5th edn., 1934, vol. I, p. 414); also Plato, *Gorgias* 493 A, *Phaedo*, 62 B, and *Cratylus*, 400 C.—Ed.]

spleen (Sect. 103) which tyrannizeth over the better sort (as they are called) of these free nations, and maketh them, in spite of their liberty and property, more wretched slaves than even the subjects of absolute power, who breathe clear air in a sunny climate: while men of low degree often enjoy a tranquility and content that no advantage of birth or fortune can equal. Such, indeed, was the case while the rich alone could afford to be debauched; but when even beggars became debauchees, the case was altered.

107 The public virtue and spirit of the British legislature never shewed itself more conspicuous in any act than in that for suppressing the immoderate use of distilled spirits among the people,[1] whose strength and numbers constitute the true wealth of a nation: though evasive arts will, it is feared, prevail so long as distilled spirits of any kind are allowed, the character of Englishmen in general being that of Brutus, *Quicquid vult, valde vult.*[2] But why should such a canker be tolerated in the vitals of a State, under any pretence or in any shape whatsoever? Better by far the whole present set of distillers were pensioners of the public, and their trade abolished by law; since all the benefit thereof put together would not balance the hundredth part of its mischief.

108 To prove the destructive effects of such spirits with regard both to the human species and individuals, we need not go so far as our colonies, or the savage natives of America. Plain proof may be had nearer home. For, albeit there is in every town or district throughout England some tough dram-drinker, set up as the devil's decoy to draw in proselytes; yet the ruined health and morals, and the beggary of such numbers, evidently shew that we need no other enemy to complete our destruction than this cheap luxury at the lower end of the State, and that a nation lighted up at both ends must soon be consumed.

109 It is much to be lamented that our insulars, who act and think so much for themselves, should yet, from grossness of air and diet, grow stupid or dote sooner than other people, who by virtue of elastic air, water-drinking, and light food, preserve

l 12 *distilled spirits*—(*A*, *B*, *C*, *D*) *spirituous liquors.*

[1] [Perhaps the Gin Act of 1736, which was a failure, or the more moderate Act of 1743. This was the worst period of intemperance in England, exposed in Hogarth's engraving *Gin Lane* (1751). Cp. below, pp. 180 and 183, and Berkeley's *Alciphron*, II, 23 and *Querist*, qu. 347-9.—Ed.] [2] [Cicero, *Epist.* 703 (*ad Att.*, XIV, 1).—Ed.]

their faculties to extreme old age; an advantage which may perhaps be approached, if not equalled, even in these regions, by tar-water, temperance and early hours. The last is a sure addition to life, not only in regard of time, which, being taken from sleep, the image of death, is added to the waking hours, but also in regard of longevity and duration in the vulgar sense. I may say too in regard of spirit and vivacity, which, within the same compass of duration, may truly and properly be affirmed to add to man's life; it being manifest, that one man, by a brisker motion of his spirits and succession of his ideas, shall live more in one hour than another in two; and that the quantity of life is to be estimated, not merely from the duration, but also from the intenseness of living. Which intense living, or, if I may so say, lively life, is not more promoted by early hours as a regimen than by tar-water as a cordial, which acts, not only as a slow medicine, but hath also an immediate and cheerful effect on the spirits (Sect. 66).

110 It must be owned that light attracted, secreted, and detained in tar (Sects. 8, 29, 40), and afterwards drawn off in its finest balsamic particles, by the gentle menstruum of cold water, is not a violent and sudden medicine, always to produce its effect at once (such, by irritating, often do more mischief than good), but a safe and mild alterative, which penetrates the whole system, opens, heals, and strengthens, the remote vessels, alters and propels their contents, and enters the minutest capillaries, and cannot therefore, otherwise than by degrees and in time, work a radical cure of chronic distempers. It gives nevertheless speedy relief in most cases, as I have found by myself and many others. I have been surprised to see persons fallen away and languishing under a bad digestion, after a few weeks recover a good stomach, and with it flesh and strength, so as to seem renewed, by the drinking of tar-water. The strength and quantity of this water to be taken by each individual person is best determined from experience. And as for the time of taking, I never knew any evil ensue from its being continued ever so long, but, on the contrary, many and great advantages, which sometimes would not perhaps begin to shew themselves till it had been taken two or three months.

111 We learn from Pliny that in the first ferment of new wine or *mustum*, the ancients were wont to sprinkle it with powdered rosin, which gave it a certain sprightliness, *quædam saporis acumina*. This was esteemed a great improver of its odour

and taste, and was, I doubt not, of its salubrity also. The brown old rosin, that is to say hardened tar, as being more easily pulverized and sifted, was most in request for this purpose. They used likewise to season their wine-vessels with pitch or rosin. And I make no doubt that if our vintners would contrive to medicate their wines with the same ingredients, they might improve and preserve them with less trouble and expense to themselves, and less danger to others. He that would know more particulars of this matter may consult Pliny and Columella.[1] I shall only add that I doubt not a similar improvement may be made of malt liquor.

112 The ῥητίνη of Theophrastus and *resina* of Pliny are sometimes used in a general sense, to signify all sorts of oily viscid exudations from plants or trees. The crude watery juice that riseth early in the spring is gradually ripened and inspissated by the solar heat, becoming in orderly succession with the seasons an oil, a balsam, and at last a resin. And it is observed by chemists that turpentine dissolved over a gentle fire is, by the constant operation of heat, successively transformed into oil, balsam, pitch, and hard friable resin, which will incorporate with oil or rectified spirit, but not with water.

113 Sir John Floyer[2] remarks that we want a method for the use of turpentine; and again, he who shall hit, saith he, on the pleasantest method of giving turpentine will do great cures in the gout, stone, catarrhs, dropsies, and cold scurvies, rheumatisms, ulcers, and obstructions of the glands. Lastly, he subjoins that, for the use of altering and amending the juices and fibres, it must be given frequently, and in such small quantities at a time, and in so commodious a manner, as will agree best with the stomach (Sect. 9), stay longest in the body, and not purge itself off; for large doses (saith he) go through too quick, and besides offend the head. Now, the infusion of tar or turpentine in cold water seems to supply the very method that was wanted, as it leaves the more unctuous and gross parts behind (Sect. 47), which might offend the stomach, intestines, and head; and as it may be easily taken, and as often, and in such quantity and such degree of strength, as suits the case of the patient. Nor should it seem that the fine spirit and volatile oil obtained by infusion of tar (Sects. 7, 42, 58) is inferior to that of turpentine, to which it

[1] [Pliny, *Hist. nat.*, XIV, 25; Columella, *De re rustica*, XII, 23 f. See note above on Sect. 11.—Ed.] [2] [Physician (1649–1734; cp. note on Sect. 42). *Medicina gerocomica*, 2nd edn. 1725, pp. 155–7 (not in 1st edn., 1724).—Ed.]

superadds the virtue of wood-soot, which is known to be very great with respect to the head and nerves; and this appears evident from the manner of obtaining tar (Sect. 13). And as the fine volatile parts of tar or turpentine are drawn off by infusion in cold water, and easily conveyed throughout the whole system of the human body; so it should seem the same method may be used with all sorts of balsams or resins whatsoever, as the readiest, easiest, and most inoffensive, as well as in many cases the most effectual, way of obtaining and imparting their virtues.

114 After having said so much of the uses of tar, I must farther add that being rubbed on them it is an excellent preservative of the teeth and gums, that it sweetens the breath, and that it clears and strengthens the voice. And, as its effects are various and useful, so there is nothing to be feared from the operation of an alterative so mild and friendly to nature. It was a wise maxim of certain ancient philosophers, that diseases ought not to be irritated by medicines. But no medicine disturbs the animal economy less than this (Sect. 133), which, if I may trust my own experience, never produces any disorder in a patient when rightly taken.

115 I knew indeed a person who took a large glass of tar-water just before breakfast, which gave him an invincible nausea and disgust, although he had before received the greatest benefit from it. But if the tar-water be taken and made in the manner prescribed at the beginning of this essay, it will, if I mistake not, have enough of the salt to be useful, and little enough of the oil to be inoffensive. I mean my own manner of making it, and not the American,[1] that sometimes makes it too strong and sometimes too weak; which tar-water, however it might serve as there used, merely for a preparative against the smallpox, yet I question whether it may be fitly used in all those various cases wherein I have found tar-water so successful. Persons more delicate than ordinary may render it palatable by mixing a drop of the chemical oil of nutmegs, or a spoonful of mountain-wine, in each glass. It may not be amiss to observe that I have known some, whose nice stomachs could not bear it in the morning,

l 4 *drawn off*—(*A*, *B*) *obtained*. *l* 13 *that it sweetens the breath* (*not in A*, *B*). *l* 28 *I mean . . . successful* (*not in A*, *B*). *l* 30 *which tar-water*—(*E*) *and*. *l* 31 *yet I question . . . used*—(*E*) *yet may not be fit to use*.

[1] [Described in Sect. 1.—Ed.]

take it at night going to bed without any inconvenience; and that with some it agrees best warm, with others cold. It may be made stronger for brute beasts, as horses, in whose disorders I have found it very useful, I believe more so than that bituminous substance called Barbados tar.

116 In very dangerous and acute cases much may be taken and often, as far as the stomach can bear. But in chronical cases, about half a pint night and morning may suffice or, in case so large a dose should prove disagreeable, half the quantity may be taken at four times, to wit, in the morning, at night going to bed, and about two hours after dinner and breakfast. A medicine of so great virtue in so many different disorders and especially in that grand enemy the fever, must needs be a benefit to mankind in general. There are nevertheless three sorts of people to whom I would peculiarly recommend it: seafaring persons, ladies, and men of studious and sedentary lives.

117 To sailors and all seafaring persons, who are subject to scorbutic disorders and putrid fevers, especially in long southern voyages, I am persuaded this tar-water would be very beneficial. And this may deserve particular notice in the present course of marine expeditions, when so many of our countrymen have perished by such distempers, contracted at sea and in foreign climates. Which, it is probable, might have been prevented by the copious use of tar-water.

118 This same water will also give charitable relief to the ladies (sect. 103), who often want it more than the parish poor; being many of them never able to make a good meal, and sitting pale, puny, and forbidden like ghosts, at their own table, victims of vapours and indigestion.

119 Studious persons also, pent up in narrow holes, breathing bad air, and stooping over their books, are much to be pitied. As they are debarred the free use of air and exercise, this I will venture to recommend as the best succedaneum to both. Though it were to be wished that modern scholars would, like the ancients, meditate and converse more in walks and gardens and open air, which upon the whole would perhaps be no hindrance to their learning, and a great advantage to their health. My own sedentary course of life had long since thrown me into an ill

l 1 *and that . . . cold (not in E). l* 2 *It may . . . Barbados tar (not in A, B. E reads—For outward washes and fomentations it may be made stronger, as by pouring on warm water; also for . . . Barbados tar). l* 8 *or, in case . . . breakfast (not in A, B). l* 10 *morning—(E) morning early.*

habit, attended with many ailments, particularly a nervous colic, which rendered my life a burden, and the more so because my pains were exasperated by exercise. But since the use of tar-water, I find, though not a perfect recovery from my old and rooted illness,[1] yet such a gradual return of health and ease, that I esteem my having taken this medicine the greatest of all temporal blessings, and am convinced that, under Providence, I owe my life to it.

120 In the distilling of turpentine and other balsams by a gentle heat it hath been observed that there riseth first an acid spirit (Sect. 7) that will mix with water; which spirit, except the fire be very gentle, is lost. This grateful acid spirit that first comes over is, as a learned chemist and physician [2] informs us, highly refrigeratory, diuretic, sudorific, balsamic, or preservative from putrefaction, excellent in nephritic cases, and for quenching thirst—all which virtues are contained in the cold infusion, which draws forth from tar only its fine flower or quintessence, if I may so say, or the native vegetable spirit, together with a little volatile oil.[3]

121 The distinguishing principle of all vegetables, that whereon their peculiar smell, taste, and specific properties depend,[4] seems to be some extremely fine and subtle spirit, whose immediate vehicle is an exceeding thin volatile oil, which is itself detained in a grosser and more viscid resin or balsam, lodged in proper cells in the bark and seeds, and most abounding in autumn or winter, after the crude juices have been thoroughly concocted, ripened, and impregnated with solar light. The spirit itself is by some supposed to be an oil highly subtilized, so as to mix with water. But such volatile oil is not the spirit, but only its vehicle, since aromatic oils being long exposed to air will lose their specific smell and taste, which fly off with the spirit or vegetable salt, without any sensible diminution of the oil.

[1] [In a letter of 16 March 1744, to Gervais, Berkeley says: 'My colic is changed to gout and sciatica, the tar-water having drove it into my limbs, and, as I hope, carrying it off by those ailments, which are nothing to the colic.' In a letter of 8 January, to the same, he had mentioned having been troubled for some time with sciatica, which in those days was also called hip-gout. Cp. note on Sect. 80.—Ed.] [2] [Boerhaave, *El. chem.* (1732), VOL. II, pp. 150f. —Ed.] [3] [Berkeley always insists on a cold infusion instead of distillation by heat on the ground that only the most volatile, and consequently the gentlest, of the acids would dissolve in cold water (Sects. 46 f., 50, 123, and p. 195).—Ed.] [4] [See note on Sect. 42.—Ed.]

122 Those volatile salts that are set free and raised by a gentle heat may justly be supposed essential[1] (Sect. 8), and to have pre-existed in the vegetable; whereas the lixivial fixed salts, obtained by the incineration of the subject, whose natural constituent parts have been altered or destroyed by the extreme force of fire, are, by later chemists, upon very good grounds, supposed not to have pre-existed therein—all such salts appearing, from the experiments of Signor Redi,[2] not to preserve the virtues of the respective vegetable subjects, and to be alike purgative and in an equal degree, whatsoever may be the shape of their points, whether sharp or obtuse. But, although fixed or lixivious salts may not contain the original properties of the subject, yet volatile salts, raised by a slight heat from vegetables, are allowed to preserve their native virtues: and such salts are readily imbibed by water.

123 The most volatile of the salts, and the most attenuated part of the oil, may be supposed the first and readiest to impregnate a cold infusion (Sects. 1, 7). And this will assist us to account for the virtues of tar-water. That volatile acid in vegetables which resists putrefaction and is their great preservative is detained in a subtle oil miscible with water, which oil is itself imprisoned in the resin or grosser part of the tar, from which it is easily set free and obtained pure by cold water.

124 The mild native acids[3] are observed more kindly to work upon and more thoroughly to dissolve metallic bodies, than the strongest acid spirits produced by a vehement fire; and it may be suspected they have the same advantage as a medicine. And as no acid, by the observation of some of the best chemists, can be obtained from the substance of animals thoroughly assimilated, it should follow that the acids received into a healthy body must be quite subdued and changed by the vital powers: but it is easier to subdue and assimilate the gentler than the stronger acids (Sect. 48).

125 I am very sensible that on such subjects arguments fall short of evidence, and that mine fall short even of what they might have been if I enjoyed better health, or those opportunities

[1] [See note on Sect. 8.—Ed.] [2] [Francesco Redi (1626–98), court-physician at Florence (and poet: his dithyrambic poem *Baccho in Toscana* was trans. into English by Leigh Hunt). See his article, 'Remarks concerning Factitious Salts' in *Philos. Transactions*, London, 1698, no. 243, pp. 281 ff.—Ed.] [3] ['Acida vegetantium vel nativa sunt vel producta fermentationis ope' (Boerhaave, *El. chem.*, 1732, VOL. I, p. 804).—Ed.]

of a learned commerce from which I am cut off in this remote corner.[1] I shall nevertheless go on as I have begun, and proceed, by reason, by conjecture, and by authority, to cast the best light I can on the obscure paths that lie in my way.

126 Sir Isaac Newton, Boerhaave, and Homberg are all agreed that the acid is a fine subtle substance, pervading the whole terraqueous globe; which produceth divers kinds of bodies, as it is united to different subjects.[2] This, according to Homberg, is the pure salt, salt the principle,[3] in itself similar and uniform, but never found alone. And although this principle be called the salt of the earth, yet it should seem it may more properly be called the salt of the air, since earth turned up and lying fallow receives it from the air. And it should seem that this is the great principle of vegetation, derived into the earth from all sorts of manures as well as from the air. This acid is allowed to be the cause of fermentation in all fermented liquors. Why, therefore, may it not be supposed to ferment the earth, and to constitute that fine penetrating principle which introduces and assimilates the food of plants, and is so fugitive as to escape all the filtrations and perquisitions of the most nice observers?

127 It is the doctrine of Sir Isaac Newton and Monsieur Homberg that, as the watery acid is that which renders salt soluble in water, so it is that same which joined to the earthy part makes it a salt. Let it therefore be considered that the organs of plants are tubes (Sects. 30, 31, 35), the filling, unfolding, and distending whereof by liquors doth constitute what is called the vegetation or growth of the plant. But earth itself is not soluble in water, so as to form one vegetable fluid therewith. Therefore the particles of earth must be joined with a watery acid; that is, they must become salts, in order to dissolve in water, that so, in the form of a vegetable juice, they may pass through the

[1] [In Cloyne, Co. Cork.—Ed.] [2] [I do not find this in Newton's *De natura acidorum*. Boerhaave, *El. chem.*, 1732, VOL. I, p. 75. Wm. Homberg (1652–1715, Dutch physician, physicist and chemist; see account of him in Fontenelle's *Éloges des Académiciens*, 1731, VOL. I, pp. 301–16; boracic acid, discovered by him, was first called *sal sedativum Hombergi*): the reference seems to be to his paper 'Essais de Chimie' in *Histoire de L'Acad. Royale des Sciences*, 1702, pp. 36 ff.—Ed.] [3] [Salt as one of the alchemists' three elements, the other two being sulphur and mercury—meaning by these not the substances commonly so known but the 'principles' respectively of solidity and solubility, of combustion, and of metallic properties (including liquidity).—Ed.]

strainers and tubes of the root into the body of the plant, swelling and distending its parts and organs, that is, increasing its bulk. Therefore the vegetable matter of the earth is in effect earth changed into salt. And to render earth fertile is to cause many of its particles to assume a saline form.

128 Hence it is observed, there are more salts in the root than in the bark, more salts in vegetables during the spring than in the autumn or winter, the crude saline juices being in the summer months partly evaporated, and partly ripened by the action and mixture of light. Hence also it appears why the dividing of earth, so as to enlarge its surface, whereby it may admit more acid from the air, is of such use in promoting vegetation; and why ashes, lime, and burnt clay are found so profitable manures—fire being in reality the acid, as is proved in the sequel (Sect. 202). Marls also and shells are useful, forasmuch as those alkaline bodies attract the acid, and raise an effervescence with it, thereby promoting a fermentation in the glebe. The excrements of animals and putrid vegetables do in like manner contribute to vegetation, by increasing the salts of the earth. And where fallows are well broken and lie long to receive the acid of the air into all their parts, this alone will be sufficient to change many terrene particles into salts and consequently render them soluble in water, and therefore fit aliment for vegetables.

129 The acid, saith Homberg,[1] is always joined to some sulphur, which determines it to this or that species, producing different salts, as it is the vegetable, bituminous, or metallic sulphur. Even the alkaline, whether volatile or lixivial salts, are supposed to be nothing but this same acid strictly detained by oil and earth, in spite of the extreme force of fire, which lodgeth in them without being able to dislodge some remains of the acid.

130 'Salts,' according to Sir Isaac Newton, 'are dry earth and watery acid united by attraction,'[2] the acid rendering them soluble in water (Sect. 127). He supposeth the watery acid to flow round the terrestrial part, as the ocean doth round the earth, being attracted thereby; and compares each particle of salt to a chaos, whereof the innermost part is hard and earthy, but the surface soft and watery. Whatever attracts and is attracted most strongly is an acid in his sense.

[1] [*Hist. de l'Acad. R. des Sciences*, année 1702, p. 37. Cp. Sect. 191.—Ed.]

[2] [*Optics* III, PT. I, qu. 31.—Ed.]

131 It seems impossible to determine the figures of particular salts. All acid solvents, together with the dissolved bodies, are apt to shoot into certain figures, and the figures in which the fossil salts crystallize have been supposed the proper natural shapes of them and their acids. But Homberg[1] hath clearly shewed the contrary, forasmuch as the same acid dissolving different bodies assumes different shapes. Spirit of nitre, for instance, having dissolved copper, shoots into hexagonal crystals; the same having dissolved iron, shoots into irregular squares; and again, having dissolved silver, forms thin crystals of a triangular figure.

132 Homberg, nevertheless, holds in general that acids are shaped like daggers, and alkalies like sheaths, and that, moving in the same liquor, the daggers run into the sheaths fitted to receive them with such violence as to raise that effervescence observed in the mixture of acids and alkalies. But it seems very difficult to conceive how or why the mere configuration of daggers and sheaths floating in the same liquor should cause the former to rush with such vehemence, and direct their points so aptly into the latter, any more than a parcel of spigots and fossets floating together in the same water should rush one into the other.

133 It should seem rather that the vehement attraction which Sir Isaac Newton attributes to all acids, whereby he supposeth them to rush towards, penetrate, shake, and divide the most solid bodies, and to ferment the liquid of vegetables, could better account for this phenomenon. It is in this attraction that Sir Isaac placeth all their activity: and indeed it should seem the figures of salts were not of such efficacy in producing their effects as the strong attractive powers whereby they are agitated and do agitate other bodies; especially if it be true (what was before remarked) that lixivious salts are alike purgative, whatever may be the shape of their angles, whether more or less acute or obtuse.

134 Sir Isaac Newton accounts for the watery acid's making earthy corpuscles soluble in water, by supposing the acid to be a mean between earth and water, its particles greater than those of water and less than those of earth, and strongly to attract both. But perhaps there is no necessary reason for supposing the parts of the acid grosser than the parts of water in order to produce

l 29 *attractive*—(*E*) *active.*

[1] [*Hist. de l'Acad. R. des Sciences*, année 1702, p. 45; cp. 1700, p. 67.—Ed.]

this effect: may not this as well be accounted for by giving them only a strong attraction or cohesion with the bodies to which they are joined?

135 The acid spirit or salt, that mighty instrument in the hand of nature, residing in the air, and diffused throughout that whole element, is discernible also in many parts of the earth, particularly in fossils, such as sulphur, vitriol, and alum. It was already observed, from Homberg, that this acid is never found pure, but hath always sulphur joined with it, and is classed by the difference of its sulphurs, whether mineral, vegetable, or animal.

136 Salts are vulgarly reckoned the most active of chemical principles. But Homberg[1] derives all their activity from the sulphurs joined with them. From which also, as hath been said, he derives all their kinds and differences (Sect. 129). Salt, water, oil and earth seem to be originally the same in all vegetables. All the difference, according to the chemists, ariseth from a spirit residing in the oil, called the *rector* or *archaeus*.[2] This is otherwise called by chemists *ens primum*, or the native spirit; whereon depend, and wherein are contained, the peculiar flavour and odour, the specific qualities and virtues, of the plant.

137 These native spirits or vegetable souls are all breathed or exhaled into the air, which seems the receptacle as well as source of all sublunary forms, the great mass or chaos which imparts and receives them. The air or atmosphere that surrounds our earth contains a mixture of all the active volatile parts of the whole habitable world, that is, of all vegetables, minerals, and animals. Whatever perspires, corrupts, or exhales, impregnates the air, which, being acted upon by the solar fire, produceth within itself all sorts of chemical operations, dispensing again those salts and spirits in new generations, which it had received from putrefactions.

138 The perpetual oscillations of this elastic and restless element operate without ceasing on all things that have life, whether animal or vegetable, keeping their fibres, vessels, and fluids in a motion always changing, as heat, cold, moisture, dryness, and other causes alter the elasticity of the air: which

[1] [*Hist. de l'Acad. R. des Sciences*, 1702, p. 37.—Ed.] [2] [A work purporting to be by the fifteenth-century monk Basil Valentine had added an *archaeus* to the alchemists' three 'elements' (cp. below, p. 234). The term was taken up by Paracelsus (*c.* 1490–1541) to indicate a supposed spiritual principle controlling the phenomena of life. His followers (among them Helmont —see Sect. 49) modified the notion into the sense referred to in the text.—Ed.]

accounts, it must be owned, for many effects. But there are many more which must be derived from other principles or qualities in the air. Thus iron and copper are corroded and gather rust in the air, and bodies of all sorts are dissolved or corrupted, which sheweth an acid to abound and diffuse itself throughout the air.

139 By this same air fire is kindled, the lamp of life preserved, respiration, digestion, nutrition, the pulse of the heart, and motion of all the muscles seem to be performed. Air therefore is a general agent, not only exerting its own, but calling forth the qualities or powers of all other bodies, by a division, comminution, and agitation of their particles, causing them to fly off and become volatile and active.

140 Nothing ferments, vegetates, or putrifies without air, which operates with all the virtues of the bodies included in it, that is, of all nature, there being no drug, salutary or poisonous, whose virtues are not breathed into the air. The air therefore is an active mass of numberless different principles, the general source of corruption and generation; on one hand dividing, abrading, and carrying off the particles of bodies, that is, corrupting or dissolving them; on the other producing new ones into being; destroying and bestowing forms without intermission.

141 The seeds of things seem to lie latent in the air,[1] ready to appear and produce their kind whenever they light on a proper matrix. The extremely small seeds of fern, mosses, mushrooms, and some other plants are concealed and wafted about in the air, every part whereof seems replete with seeds of one kind or other. The whole atmosphere seems alive. There is everywhere acid to corrode, and seed to engender. Iron will rust, and mould will grow in all places. Virgin earth becomes fertile, crops of new plants ever and anon shew themselves; all which demonstrates the air to be a common seminary and receptable of all vivifying principles.

142 Air may also be said to be the seminary of minerals and metals, as it is of vegetables. Mr. Boyle[2] informs us that the

[1] [Cp. Nieuwentijdt (who is referred to in Sects. 190 and 196): 'The air is the magazine or treasury from whence that which renders the earth fruitful is communicated thereto, as the frequent ploughing and turning up the earth and exposing it to the air has shown experimentally for many ages' (*The Religious Philosopher*, Eng. tr., 1718–19, VOL. III, p. 1024).—Ed.] [2] ['Suspicions about some hidden Qualities in the Air' (*Philos. Works*, ed. by Shaw, 2nd edn., 1738, VOL. III, pp. 94, 97 and 80).—Ed.]

exhausted ores of tin and iron being exposed to the air become again impregnated with metal, and that ore of alum having lost its salt recovers it after the same manner. And numberless instances there are of salts produced by the air, that vast collection or treasury of active principles, from which all sublunary bodies seem to derive their forms, and on which animals depend for their life and breath.

143 That there is some latent vivifying spirit dispersed throughout the air common experience sheweth; inasmuch as it is necessary both to vegetables and animals (Sects. 138, 139), whether terrestrial or aquatic, neither beasts, insects, birds, nor fishes being able to subsist without air. Nor doth all air suffice, there being some quality or ingredient of which when air is deprived it becometh unfit to maintain either life or flame.[1] And this even though the air should retain its elasticity; which, by the bye, is an argument that air doth not act only as an antagonist to the intercostal muscles.[2] It hath both that and many other uses. It gives and preserves a proper tone to the vessels: this elastic fluid promotes all secretions: its oscillations keep every part in motion: it pervades and actuates the whole animal system, producing great variety of effects, and even opposite in different parts, cooling at the same time and heating, distending and contracting, coagulating and resolving, giving and taking, sustaining life and impairing it, pressing without and expanding within, abrading some parts, at the same time insinuating and supplying others, producing various vibrations in the fibres and ferments in the fluids: all which must needs ensue from such a subtle, active, heterogeneous and elastic fluid.

144 But there is, as we have observed, some one quality or ingredient in the air, on which life more immediately and principally depends. What that is, though men are not agreed, yet it is agreed it must be the same thing that supports the vital and the common flame; it being found that when air, by often breathing in it, is become unfit for the one, it will no longer serve for the

l 3 *manner*—(*A*, *B*) *manner. The like is related of silver and iron ores. l* 29 *we have*—(*A*, *B*) *was before;* (*E*) *we before.*

[1] [This had been proved experimentally by John Mayow (1640–79): see his tract *De respiratione* (1668), enlarged in *Tractatus medico-physici* (1674).—Ed.]

[2] [Robt. Hooke (1635–1703)had shown that if a current of air is blown continuously over the surfaces of the lungs, the motion of the walls of the chest is not necessary to life. The isolation of oxygen was not effected until 1774, by Priestley.—Ed.]

other. The like is observable in poisonous damps or steams, wherein flame cannot be kindled, as is evident in the Grotto del Cane near Naples.[1] And here it occurs, to recommend the plunging them into cold water, as an experiment to be tried on persons affected by breathing a poisonous vapour in old vaults, mines, deep holes, or cavities under ground; which, I am apt to think, might save the lives of several, by what I have seen practised on a dog convulsed, and in all appearance dead, but instantly reviving on being taken out of the above-mentioned Grotto, and thrown into a lake adjacent.

145 Air, the general menstruum and seminary, seemeth to be only an aggregate of the volatile parts of all natural beings, which, variously combined and agitated, produce many various effects. Small particles in a near and close situation strongly act upon each other, attracting, repelling, vibrating. Hence divers fermentations, and all the variety of meteors, tempests, and concussions both of earth and firmament. Nor is the microcosm[2] less affected thereby. Being pent up in the viscera, vessels, and membranes of the body, by its salts, sulphurs, and elastic power, it engenders cholics, spasms, hysteric disorders, and other maladies.

146 The specific quality of air is taken to be permanent elasticity. Mr. Boyle is expressly of this opinion. And yet whether there be any such thing as permanenity elastic air may be doubted, there being many things which seem to rob the air of this quality, or at least lessen and suspend its exertion. The salts and sulphurs, for instance, that float in the air abate much of its elasticity by their attraction.

147 Upon the whole, it is manifest that air is no distinct element, but a mass or mixture of things the most heterogeneous and even opposite to each other (Sects. 137, 145), which become air by acquiring an elasticity and volatility from the attraction of some active subtle substance—whether it be called fire, æther, light, or the vital spirit of the world; in like manner as the particles of antimony, of themselves not volatile, are carried off in

l 14 *produce*—(*E*) *produceth.*

[1] [Grotto of the Dog, so called because of the practice (now forbidden) mentioned by Berkeley. The layer of carbonic acid gas is little higher than a dog. Berkeley visited Naples in 1717.—Ed.] [2] [The human body (as in Sects. 86, 154, 261 and 361). The *Oxford English Dict.* notes this meaning only as jocular. In Sect. 166 it means any living body.—Ed.]

sublimation and rendered volatile by cohering with the particles of sal ammoniac. But action and reaction being equal, the spring of this æthereal spirit is diminished by being imparted. Its velocity and subtlety are also less from its being mixed with grosser particles. Hence sound moves slower than light, as mud than water.

148 Whether air be only freed and fixed, or generated and destroyed, it is certain that air begins and ceases to exert and shew itself. Much by experiments seems to be generated, not only from animals, fruits, and vegetables, but also from hard bodies. And it is observed by Sir Isaac Newton that air produced from hard bodies is most elastic. The transmutation of elements, each into other, hath been anciently held. In Plutarch we find it was the opinion of Heraclitus, that the death of fire was a birth to air, and the death of air a birth to water.[1] This opinion is also maintained by Sir Isaac Newton.[2] Though it may be questioned whether what is thought a change be not only a disguise.

149 Fire seems the most elastic and expansive of all bodies. It communicates this quality to moist vapours and dry exhalations, when it heats and agitates their parts, cohering closely with them, overcoming their former mutual attraction, and causing them, instead thereof, reciprocally to repel each other and fly asunder, with a force proportionable to that wherewith they had cohered.

150 Therefore in air we may conceive two parts; the one more gross, which was raised and carried off from the bodies of this terraqueous mass; the other a fine subtle spirit, by means whereof the former is rendered volatile and elastic. Together they compose a medium whose elasticity is less than that of pure æther, fire, or spirit, in proportion to the quantity of salts, vapours, and heterogeneous particles contained therein. Hence it follows that there is no such thing as a pure simple element of air. It follows also that on the highest mountains air should be more rare than in proportion to the vulgar rule, of the spaces being reciprocally as the pressures; and so in fact it is said to have been found by the gentlemen of the French Academy of Sciences.

151 Æther, fire, or spirit, being attracted and clogged by heterogeneous particles, becometh less active; and the particles

l 6 *water*—(*A*, *B*) *clear water*. *l* 8 *and*—(*A*, *B*, *C*, *D*) *or*.

[1] [*De* 'EI' *apud Delphos*, 18, p. 392 C (frag. 76 in Diels, *Fragmente der Vorsokratiker*, 5th edn., 1934, VOL. I, p. 168).—Ed.] [2] [*Optics*, III, PT. I, qu. 30.—Ed.]

cohering with those of æther become more active than before. Air therefore is a mass of various particles, abraded and sublimated from wet and dry bodies of all sorts, cohering with particles of æther; the whole permeated by pure æther, or light, or fire—for these words are used promiscuously by ancient philosophers.[1]

152 This æther or pure invisible fire, the most subtle and elastic of all bodies, seems to pervade and expand itself throughout the whole universe. If air be the immediate agent or instrument in natural things, it is the pure invisible fire that is the first natural mover or spring from whence the air derives its power (Sects. 139, 149, 151). This mighty agent is everywhere at hand, ready to break forth into action, if not restrained and governed with the greatest wisdom.[2] Being always restless and in motion, it actuates and enlivens the whole visible mass, is equally fitted to produce and to destroy, distinguishes the various stages of nature, and keeps up the perpetual round of generations and corruptions, pregnant with forms which it constantly sends forth and resorbs. So quick in its motions, so subtle and penetrating in its nature, so extensive in its effects, it seemeth no other than the vegetative soul or vital spirit of the world.

153 The animal spirit in man is the instrumental or physical cause[3] both of sense and motion. To suppose sense in the world would be gross and unwarranted. But locomotive faculties[4] are evident in all its parts. The Pythagoreans, Platonists, and Stoics held the world to be an animal;[5] though some of them have chosen to consider it as a vegetable. However, the phenomena and effects do plainly shew there is a spirit that moves, and a Mind or Providence that presides. This Providence, Plutarch saith, was thought to be in regard to the world what the soul is in regard to man.

[1] [Cp. Diogenes Laertius, VII, 137, on the Stoics: τὸ πῦρ, ὃ δὴ αἰθέρα καλεῖσθαι.—Ed.] [2] [Cp. Cicero, *De nat. deorum*, II, 36, xcii: 'Conflagrare terras necesse sit a tantis ardoribus, moderatione et temperatione sublata.' Nieuwentijdt's *Religious Philosopher* has a section (Contemplation XXI, Sect. 17) entitled 'The wisdom of Him that restrains the power of fire.'—Ed.] [3] [*I.e.* not the originative or active cause, which, Berkeley always held, is mind: see Sects. 154, 237 and 247 ff., and *Principles*, Sects. 25–33. Even moving bodies are not active, but are being acted on (*De Motu*, Sects. 26, 70 f.).—Ed.] [4] [See Sect. 230.—Ed.] [5] [For the neo-Pythagoreans see Ocellus in Sect. 279 below; for Plato, *Timaeus*, 30 B and 34 B; for the Stoics, Diogenes Laertius VII, 139, 143 and 156, and Cicero, *De natura deorum*, I, 10 f., II, 11 f.—Ed.]

154 The order and course of things, and the experiments we daily make, shew there is a Mind that governs and actuates this mundane system, as the proper real agent and cause; and that the inferior instrumental cause is pure æther, fire, or the substance of light (Sects. 29, 37, 136, 149), which is applied and determined by an Infinite Mind in the macrocosm or universe, with unlimited power, and according to stated rules; as it is in the microcosm with limited power and skill by the human mind. We have no proof, either from experiment or reason, of any other agent or efficient cause than mind or spirit. When, therefore, we speak of corporeal agents or corporeal causes, this is to be understood in a different, subordinate, and improper sense.[1]

155 The principles whereof a thing is compounded, the instrument used in its production, and the end for which it was intended, are all in vulgar use termed causes,[2] though none of them be, strictly speaking, agent or efficient. There is not any proof that an extended corporeal or mechanical cause doth really and properly act, even motion itself being in truth a passion. Therefore though we speak of this fiery substance as acting, yet it is to be understood only as a mean or instrument, which indeed is the case of all mechanical causes whatsoever. They are, nevertheless, sometimes termed agents and causes, although they are by no means active in a strict and proper signification. When therefore force, power, virtue, or action are mentioned as subsisting in an extended and corporeal or mechanical being, this is not to be taken in a true, genuine and real, but only in a gross and popular sense, which sticks in appearances, and doth not analyse things to their first principles. In compliance with established language and the use of the world, we must employ the popular current phrase. But then in regard to truth we ought to distinguish its meaning. It may suffice to have made this declaration once for all, in order to avoid mistakes.

156 The *calidum innatum*, the vital flame or animal spirit in man, is supposed the cause of all motions in the several parts of his body, whether voluntary or natural. That is, it is the

l 37 *it is*—(*E*) *it is accounted.*

[1] [So Berkeley had always held. Cp. Plato's distinction between causes and concauses (αἴτια and συναίτια) in *Timaeus* 46 C and 68 E and *Phaedo* 99 A.—Ed.]

[2] [In Aristotle's terms—material, efficient, and final causes respectively. —Ed.]

instrument by means whereof the mind exerts and manifests herself in the motions of the body. In the same sense, may not fire be said to have force, to operate and agitate the whole system of the world, which is held together and informed by one presiding mind, and animated throughout by one and the same fiery substance, as an instrumental and mechanical agent, not as a primary real efficient?

157 This pure spirit or invisible fire is ever ready to exert and shew itself in its effects (Sect. 152), cherishing, heating, fermenting, dissolving, shining, and operating in various manners, where a subject offers to employ or determine its force. It is present in all parts of the earth and firmament, though perhaps latent and unobserved, till some accident produceth it into act, and renders it visible in its effects.

158 There is no effect in nature great, marvellous, or terrible but proceeds from fire,[1] that diffused and active principle, which, at the same time that it shakes the earth and heavens, will enter, divide, and dissolve the smallest, closest, and most compacted bodies. In remote cavities of the earth it remains quiet, till perhaps an accidental spark, from the collision of one stone against another, kindles an exhalation that gives birth to an earthquake or tempest which splits mountains or overturns cities. This same fire stands unseen in the focus of a burning glass, till subjects for it to act upon come in its way, when it is found to melt, calcine, or vitrify the hardest bodies.

159 No eye could ever hitherto discern, and no sense perceive, the animal spirit in a human body, otherwise than from its effects. The same may be said of pure fire, or the spirit of the universe, which is perceived only by means of some other bodies, on which it operates, or with which it is joined. What the chemists say of pure acids being never found alone [2] might as well be said of pure fire.

160 The mind of man acts by an instrument necessarily. The τὸ ἡγεμονικόν, or Mind presiding in the world, acts by an instrument freely. Without instrumental and second causes there could be no regular course of nature.[3] And without a regular course, nature could never be understood; mankind must always be at a loss, not knowing what to expect, or how to govern themselves, or direct their actions for the obtaining of any end.

[1] ['Without Fire nothing visible can come to be' (Plato, *Timaeus*, 31 B).—Ed.]
[2] [See Sect. 129.—Ed.] [3] [As Berkeley had maintained in *Principles*, Sects. 30 f. and 62.—Ed.]

Therefore in the government of the world physical agents, improperly so called, or mechanical, or second causes, or natural causes, or instruments, are necessary to assist, not the Governor, but the governed.

161 In the human body the mind orders and moves the limbs: but the animal spirit is supposed the immediate physical cause of their motion. So likewise in the mundane system, a mind presides: but the immediate, mechanical, or instrumental cause that moves or animates all its parts, is the pure elementary fire or spirit of the world. The more fine and subtle part or spirit is supposed to receive the impressions of the First Mover, and communicate them to the grosser sensible parts of this world. Motion, though in metaphysical rigour and truth a passion or mere effect, yet in physics passeth for an action. And by this action all effects are supposed to be produced. Hence the various communications, determinations, accelerations of motion, constitute the laws of nature.

162 The pure æther or invisible fire contains parts of different kinds, that are impressed with different forces, or subjected to different laws of motion, attraction, repulsion, and expansion, and endued with divers distinct habitudes towards other bodies. These seem to constitute the many various qualities (Sects. 37, 40, 44), virtues, flavours, odours, and colours which distinguish natural productions. The different modes of cohesion, attraction, repulsion, and motion appear to be the source from whence the specific properties are derived, rather than different shapes or figures. This, as hath been already observed,[1] seems confirmed by the experiment of fixed salts operating one way, notwithstanding the difference of their angles. The original particles productive of odours, flavours, and other properties, as well as of colours,[2] are, one may suspect, all contained and blended together in that universal and original seminary of pure elementary fire; from which they are diversely separated and attracted by the various subjects of the animal, vegetable, and mineral kingdoms, which thereby become classed into kinds, and endued

[1] [In Sects. 132 f.—Ed.] [2] [Here Berkeley seems to allow (and in Sect. 266 to approve) the mechanical explanation of the so-called secondary qualities, which he had rejected in *Principles*, Sects. 9 f. and *Three Dialogues*, DIAL. 1. But 'productive of' is to be understood in the sense laid down in Sect. 155 above; besides, primary and secondary qualities, being alike phenomena, are alike and equally mind-dependent entities (cp. Sect. 251). See my Introduction, p. 14.—Ed.]

with those distinct properties which continue till their several forms, or specific proportions of fire, return into the common mass.

163 As the soul acts immediately on pure fire, so pure fire operates immediately on air; that is, the abrasions of all terrestrial things being rendered volatile and elastic by fire (Sects. 149, 150, 152), and at the same time lessening the volatility and expansive force of the fire, whose particles they attract and adhere to (Sect. 147), there is produced a new fluid, more volatile than water or earth, and more fixed than fire. Therefore, the virtues and operations imputed to air must be ultimately attributed to fire, as that which imparts activity to air itself.

164 The element of æthereal fire or light seems to comprehend, in a mixed state, the seeds, the natural causes and forms (Sect. 43), of all sublunary things. The grosser bodies separate, attract, and repel the several constituent particles of that heterogeneous element; which, being parted from the common mass, make distinct essences, producing and combining together such qualities and properties as are peculiar to the several subjects, and thence often extracted in essential oils or odoriferous waters, from whence they exhale into the open air, and return into their original element.

165 Blue, red, yellow, and other colours have been discovered by Sir Isaac Newton to depend on the parted rays or particles of light. And, in like manner, a particular odour or flavour seemeth to depend on peculiar particles of light or fire (Sect. 40); as appears from heat's being necessary to all vegetation whatsoever, and from the extreme minuteness and volatility of those vegetable souls or forms, flying off from the subjects without any sensible diminution of their weight. These particles, blended in one common ocean, should seem to conceal the distinct forms, but, parted and attracted by proper subjects, disclose or produce them; as the particles of light, which, when separated, form distinct colours, being blended are lost in one uniform appearance.

166 Agreeably thereto an æthereal substance or fire was supposed by Heraclitus[1] to be the seed of the generation of all things, or that from which all things drew their original. The Stoics

l 15 *separate*—(*A*, *B*) *do separate.*

[1] [For Heraclitus, see Diogenes Laertius, IX, 7; for the Stoics, *ibid.* VII, 139; for Pythagoreans, *ibid.*, VIII, 27.—Ed.]

also taught that all substance was originally fire, and should return to fire; that an active subtle fire was diffused or expanded throughout the whole universe, the several parts whereof were produced, sustained, and held together, by its force. And it was the opinion of the Pythagoreans, as Laertius informs us, that heat or fire was the principle of life, animating the whole system, and penetrating all the elements (Sects. 152, 153). The Platonists, too, as well as the Pythagoreans, held fire to be the immediate natural agent, or animal spirit, to cherish, to warm, to heat, to enlighten, to vegetate, to produce the digestions, circulations, secretions, and organical motions, in all living bodies, vegetable or animal, being effects of that element, which, as it actuates the macrocosm, so it animates the microcosm. In the *Timæus* of Plato,[1] there is supposed something like a net of fire and rays of fire in a human body. Doth not this seem to mean the animal spirit, flowing, or rather darting, through the nerves?

167 According to the Peripatetics, the form of heaven, or the fiery æthereal substance, contains the forms of all inferior beings (Sect. 43). It may be said to teem with forms, and impart them to subjects fitted to receive them. The vital force thereof in the Peripatetic sense is vital to all, but diversely received according to the diversity of the subjects. So all colours are virtually contained in the light; but their actual distinctions of blue, red, yellow, and the rest, depend on the difference of the objects which it illustrates. Aristotle, in the book *De Mundo*,[2] supposeth a certain fifth essence, an æthereal nature, unchangeable and impassive; and next in order a subtle flaming substance, lighted up or set on fire by that æthereal and divine nature. He supposeth, indeed, that God is in heaven, but that His power, or a force derived from Him, doth actuate and pervade the universe.

168 If we may credit Plutarch,[3] Empedocles thought æther or heat to be Jupiter. Æther by the ancient philosophers was used to signify promiscuously sometimes fire and sometimes air. For they distinguished two sorts of air. Plato, in the *Timæus*,[4] speaking of air, saith there are two kinds, the one more fine and subtle, called æther, the other more gross, and replete with vapours. This æther or purer medium seems to have been the air or principle from which all things, according to Anaximenes, derived

[1] [78 B; cp. 45 B.—Ed.] [2] [II. 392*a*, 31. This work is no longer attributed to Aristotle: it seems to be a late eclectic work with a Stoic bias. Cp. below, Sect. 328.—Ed.] [3] [ps.-Plut., *De plac. philos.*, I, 3.—Ed.] [4] [58 D.—Ed.]

their birth, and into which they were back again resolved at their death. Hippocrates, in his treatise *De Diæta*,[1] speaketh of a fire pure and invisible; and this fire, according to him, is that which, stirring and giving movement to all things, causes them to appear, or, as he styles it, come into evidence, that is, to exist, every one in its time, and according to its destiny.

169 This pure fire, æther, or substance of light was accounted in itself invisible and imperceptible to all our senses, being perceived only by its effects, such as heat, flame, and rarefaction. To which we may add, that the moderns pretend further to have perceived it by weight, inasmuch as the aromatic oils which most abound with fire, as being the most readily and vehemently inflamed, are above all others the heaviest. And by an experiment of Mr. Homberg's,[2] four ounces of regulus of antimony, being calcined by a burning-glass for an hour together, were found to have imbibed and fixed seven drams of the substance of light.

170 Such is the rarefying and expansive force of this element, as to produce, in an instant of time, the greatest and most stupendous effects: a sufficient proof not only of the power of fire, but also of the wisdom with which it is managed, and withheld from bursting forth every moment to the utter ravage and destruction of all things. And it is very remarkable that this same element, so fierce and destructive, should yet be so variously tempered and applied as to be withal the salutary warmth, the genial, cherishing, and vital flame of all living creatures. It is not therefore to be wondered that Aristotle[3] thought the heat of a living body to be somewhat divine and celestial, derived from that pure æther to which he supposed the incorporeal Deity (χωριστὸν εἶδος) to be immediately united, or on which he supposed it immediately to act.

171 The Platonists held their intellect resided in soul, and soul in an æthereal vehicle.[4] And that as the soul was a middle nature, reconciling intellect with æther, so æther was another middle nature, which reconciled and connected the soul with

[1] [II, 31; cp. I, 11.—Ed.] [2] [*Hist. de l'Acad. R. des Sciences*, année 1705, p. 94. Robert Boyle (1627–91) had already shown that metals when burnt increase in weight. This was first and rightly explained, as in the text, as being due to an accession of something from the air. An opposite explanation, that the metals lose something that has negative weight ('phlogiston') was beginning to be current in Berkeley's day, and was favoured even by Priestley.—Ed.] [3] *De animal. generat.*, II. 3 (736*b*, 35).—Ed.] [4] [The source seems to be Plato's *Timaeus*, 30 B and 31 B.—Ed.]

grosser bodies (Sects. 152, 154). Galen[1] likewise taught that, admitting the soul to be incorporeal, it hath for its immediate tegument or vehicle a body of æther or fire, by the intervention whereof it moveth other bodies, and is mutually affected by them. This interior clothing was supposed to remain upon the soul not only after death, but after the most perfect purgation, which, in length of time, according to the followers of Plato and Pythagoras, cleansed the soul,

. . . . purumque reliquit
æthereum sensum atque auraï simplicis ignem.[2]

This tunicle of the soul, whether it be called pure æther, or luciform vehicle, or animal spirit, seemeth to be that which moves and acts upon the gross organs, as it is determined by the soul, from which it immediately receives impression, and in which the moving force truly and properly resides. Some moderns have thought fit to deride all that is said of æthereal vehicles as mere jargon or words without a meaning. But they should have considered that all speech concerning the soul is altogether, or for the most part, metaphorical; and that, agreeably thereunto, Plato[3] speaketh of the mind or soul as a driver that guides and governs a chariot, which is, not unfitly, styled αὐγοειδές, a luciform æthereal vehicle, or ὄχημα—terms expressive of the purity, lightness, subtlety, and mobility of that fine celestial nature in which the soul immediately resides and operates.

172 It was a tenet of the Stoics that the world was an animal,[4] and that Providence answered to the reasonable soul in man.[5] But then the Providence or Mind was supposed by them to be immediately resident or present in fire, to dwell therein, and to act thereby. Briefly, they conceived God to be an intellectual and fiery spirit, πνεῦμα νοερὸν καὶ πυρῶδες.[6] Therefore, though they looked on fire (Sect. 166) as the τὸ ἡγεμονικὸν or governing principle of the world, yet it was not simply fire, but animated with a mind.

173 Such are the bright and lively signatures of a divine Mind, operating and displaying itself in fire and light throughout the world, that, as Aristotle observes in his book *De Mundo*,[7]

[1] [*c.* A.D. 130–200. I have not been able to find a relevant passage in the many works attributed to Galen.—Ed.] [2] [Virgil, *Aeneid*, VI, 746.—Ed.] [3] [*Phaedrus*, 246.—Ed.] [4] [See note on Sect. 153.—Ed.] [5] [Plutarch, *De comm. notitiis*, XXXVI, 5, p. 1077 D.—Ed.] [6] [Diogenes Laertius, VII, 156.—Ed.] [7] [397*b*, 16. See note on Sect. 167.—Ed.]

all things seem full of divinities, whose apparitions on all sides strike and dazzle our eyes. And it must be owned the chief philosophers and wise men of antiquity, how much soever they attributed to second causes and the force of fire, yet they supposed a Mind or Intellect always resident therein, active or provident, restraining its force, and directing its operations.

174 Thus Hippocrates, in his treatise *De Diæta*, speaks of a strong but invisible fire (Sect. 168), that rules all things without noise.[1] Herein, saith he, resides soul, understanding, prudence, growth, motion, diminution, change, sleep, and waking. This is what governs all things, and is never in repose. And the same author, in his tract *De Carnibus*, after a serious preface setting forth that he is about to declare his own opinion, expresseth it in these terms: 'That which we call heat, θερμόν, appears to me something immortal, which understands all things, which sees and knows both what is present and what is to come.'

175 This same heat is also what Hippocrates calls nature, the author of life and death, good and evil. It is farther to be noted of this heat, that he maketh it the object of no sense. It is that occult universal nature, and inward invisible force, which actuates and animates the whole world, and was worshipped by the ancients under the name of Saturn; which Vossius[2] judges, not improbably, to be derived from the Hebrew word *satar*, to lie hidden or concealed. And what hath been delivered by Hippocrates agrees with the notions of other philosophers: Heraclitus (Sect. 166), for instance, who held fire to be the principle and cause of the generation of all things, did not mean thereby an inanimate element, but, as he termed it, πῦρ ἀείζωον, an everliving fire.[3]

176 Theophrastus, in his book *De Igne*,[4] distinguisheth between heat and fire. The first he considers as a principle or cause, not that which appeareth to sense as a passion or accident existing in a subject, and which is in truth the effect of that unseen principle. And it is remarkable that he refers the treating of this invisible fire or heat to the investigation of the first causes. Fire, the principle, is neither generated nor destroyed, is everywhere and always present (Sect. 43); while its effects in

[1] [I, 11 (sine strepitu). The next reference is to *De carn.*, 1, *ad init.*—Ed.]
[2] [Probably Isaac Vossius (1618–89), canon of Windsor (son of the theologian and classical scholar G. J. Vossius), a copious writer.—Ed.] [3] [Frag. 20 in Bywater (*Heracliti reliquae*, 1877); fr. 30 in Diels (*Fragmente der Vorsokratiker*, 5th edn., 1934).—Ed.] [4] [VI, 44.—Ed.]

different times and places shew themselves more or less, and are very various, soft and cherishing, or violent and destructive, terrible or agreeable, conveying good and evil, growth and decay, life and death, throughout the mundane system.

177 It is allowed by all that the Greeks derived much of their philosophy from the Eastern nations. And Heraclitus is thought by some to have drawn his principles from Orpheus, as Orpheus did from the Egyptians; or, as others write, he had been auditor of Hippasus,[1] a Pythagorean, who held the same notion of fire, and might have derived it from Egypt by his master Pythagoras, who had travelled into Egypt, and been instructed by the sages of that nation, one of whose tenets it was, that fire was the principle of all action; which is agreeable to the doctrine of the Stoics, that the whole of things is administered by a fiery intellectual spirit. In the *Asclepian Dialogue*[2] we find this notion, that all parts of the world vegetate by a fine subtle æther, which acts as an engine or instrument, subject to the will of the supreme God.

178 As the Platonists held intellect to be lodged in soul, and soul in æther (Sect. 157); so it passeth for a doctrine of Trismegistus in the *Pimander*,[3] that mind is clothed by soul, and soul by spirit. Therefore, as the animal spirit of man, being subtle and luminous, is the immediate tegument of the human soul, or that wherein and whereby she acts; even so the spirit of the world, that active fiery ethereal substance of light, that permeates and animates the whole system, is supposed to clothe the soul, which clothes the mind of the universe.

179 The Magi likewise said of God, that he had light for his body and truth for his soul. And in the Chaldaic oracles[4] all

[1] [So Suidas, *s.v.* *Ἡράκλειτος*. Hippasus lived in the middle of the fifth century B.C., too late to have been the teacher of Heraclitus.—Ed.] [2] [I, 2b (*Hermetica*, ed. W. Scott, VOL. I, p. 289). The dialogue 'Poimandres' (mentioned in the next section) and other pieces compose a collection that has come down under the name of Hermes Trismegistus, the Greek name for 'the great Thoth,' to whom were anciently attributed the sacred books of Egypt. In Berkeley's day they were still accepted as ancient Egyptian lore, though Sect. 298 shows that Berkeley was aware of their pseudepigraphic character. They are now assigned to the fourth and fifth centuries of our era.—Ed.] [3] [X, 13 (*Hermetica*, VOL. I, p. 194).—Ed.] [4] [A poem often quoted by the Neoplatonists, who accepted it, as does Berkeley, as ancient doctrine. It seems to be no earlier than about A.D. 200. Berkeley's Greek quotations are from fragments preserved by Proclus, *In Parmenidem* (*Opera*, ed. Cousin, VOL. V, pp. 204 and 205).—Ed.]

things are supposed to be governed by a πῦρ νοερόν, or intellectual fire. And in the same oracles the creative mind is said to be clothed with fire, ἐσσάμενος πυρὶ πῦρ, which oriental reduplication of the word 'fire' seems to imply the extreme purity and force thereof. Thus also in the Psalms, 'Thou art clothed with light as with a garment,'[1] where the word rendered 'light' might have been rendered 'fire'; the Hebrew letters being the same with those in the word which signifies fire, all the difference being in the pointing, which is justly counted a late invention. That other Scripture sentence is remarkable: 'Who maketh his ministers a flaming fire,' which might, perhaps, be rendered more agreeably to the context as well as consistently with the Hebrew, after this manner: 'Who maketh flaming fire his ministers:' and the whole might run thus: 'Who maketh the winds his messengers, and flaming fire his ministers.'

180 A notion of something divine in fire, animating the whole world, and ordering its several parts, was a tenet of very general extent (Sects. 156, 157, 163, 166, 167, 168, 170, 172, 173, 174, 175, 177, &c.), being embraced in the most distant times and places, even among the Chinese themselves, who make *tien*, æther, or heaven, the sovereign principle or cause of all things, and teach that the celestial virtue, by them called *li*, when joined to corporeal substance, doth fashion, distinguish, and specificate all natural beings. This *li* of the Chinese seems to answer the forms of the Peripatetics; and both bear analogy to the foregoing philosophy of fire.

181 The heaven is supposed pregnant with virtues and forms, which constitute and discriminate the various species of things. And we have more than once observed that, as the light, fire, or celestial æther, being parted by refracting or reflecting bodies, produceth variety of colours, even so, that same apparently uniform substance, being parted and secreted by the attracting and repelling powers of the divers secretory ducts of plants and animals, that is, by natural chemistry, produceth or imparteth the various specific properties of natural bodies. Whence the tastes, and odours, and medicinal virtues so various in vegetables.

[1] [Psalm civ, 2. The Hebrew *'or* light, and *'ur* fire. Berkeley had been Lecturer in Hebrew in his college (1723). The next text is from verse 4 of the same psalm. Berkeley's reading of it agrees with that in Dr. James Moffatt's recent version.—Ed.]

182 The *tien* is considered and adored by the learned Chinese as living and intelligent æther, the πῦρ νοερὸν of the Chaldeans and the Stoics. And the worship of things celestial, the sun and stars, among the Eastern nations less remote, was on account of their fiery nature, their heat and light, and the influence thereof. Upon these accounts, the sun was looked on by the Greek theologers as the spirit of the world and the power of the world. The cleansing quality, the light and heat of fire, are natural symbols of purity, knowledge, and power, or, if I may so say, the things themselves, so far as they are perceptible to our senses, or in the same sense as motion is said to be action. Accordingly, we find a religious regard was paid to fire, both by Greeks and Romans, and indeed by most, if not all, the nations of the world.

183 The worship of Vesta at Rome was, in truth, the worship of fire.

Nec tu aliud Vestam quam vivam intellige flammam,

saith Ovid in his *Fasti*.[1] And as in old Rome the eternal fire was religiously kept by virgins, so in Greece, particularly at Delphi and Athens, it was kept by widows. It was well known that Vulcan or fire was worshipped with great distinction by the Egyptians. The Zabii or Sabeans are also known to have been worshippers of fire. It appears too from the Chaldean oracles that fire was regarded as divine by the sages of that nation. And it is supposed that Ur of the Chaldeans was so called from the Hebrew word signifying fire,[2] because fire was publicly worshipped in that city. That a religious worship was paid to fire by the ancient Persians and their Magi is attested by all antiquity. And the sect of Parsees, or old Gentiles, of whom there are considerable remains at this day both in the Mogul's country and in Persia, doth testify the same.

184 It doth not seem that their prostrations before the perpetual fires, preserved with great care in their Pyreia, or fire-temples, were merely a civil respect, as Dr. Hyde[3] would have it thought; although he brings good proof that they do not invoke the fire on their altars, or pray to it, or call it God, and that they acknowledge a supreme invisible Deity. Civil respects are paid

[1] [VI. 291.—Ed.] [2] [See note on Sect. 179. Ur, it is now held, was a centre of the worship of Sin, the *moon*-god.—Ed.] [3] [Thos. Hyde (1636–1703), Bodley's Librarian and Professor of Hebrew at Oxford. The book referred to in the next section is his *Historia Religionis veterum Persarum eorumque Magorum* (1700).—Ed.]

to things as related to civil power: but such relation doth not appear in the present case. It should seem, therefore, that they worship God as present in the fire, which they worship or reverence not ultimately or for itself, but relatively to the supreme Being. Which it is not unlikely was elsewhere the case at first, though the practice of men, especially of the vulgar, might in length of time degenerate from the original institution, and rest in the object of sense.

185 Doctor Hyde, in his *History of the Religion of the Ancient Persians*, would have it thought that they borrowed the use and reverence of perpetual fires from the Jewish practice, prescribed in the Levitical law, of keeping a perpetual fire burning on the altar. Whether that was the case or not, thus much one may venture to say: it seems probable that, whatever was the original of this custom among the Persians, the like customs among the Greeks and Romans were derived from the same source.

186 It must be owned there are many passages in Holy Scripture (Sect. 179) that would make one think the supreme Being was in a peculiar manner present and manifest in the element of fire. Not to insist that God is more than once said to be a consuming fire, which might be understood in a metaphorical sense; the divine apparitions were by fire, in the bush, at Mount Sinai, on the tabernacle, in the cloven tongues. God is represented in the inspired writings as descending in fire, as attended by fire, or with fire going before Him. Celestial things, as angels, chariots, and such-like phenomena, are invested with fire, light, and splendour. Ezekiel in his visions beheld fire and brightness, lamps, burning coals of fire, and flashes of lightning. In a vision of Daniel, the throne of God appeared like a fiery flame, and His wheels like burning fire. Also a fiery flame issued and came forth from before Him.

187 At the transfiguration, the apostles saw our Saviour's face shining as the sun, and his raiment white as light, also a lucid cloud, or body of light, out of which the voice came; which visible light and splendour was, not many centuries ago, maintained by the Greek church to have been divine, and uncreated, and the very glory of God; as may be seen in the *History* wrote by the Emperor John Cantacuzene.[1] And of late years Bishop

[1] [*c.* 1292–1383. *History*, II. 39, cccxxxii and 40, cccxxxiv (in Migne, *Patrologia Graeca*, VOL. 153).—Ed.]

Patrick[1] gives it as his opinion that in the beginning of the world the Shekinah, or divine presence, which was then frequent and ordinary, appeared by light or fire. In commenting on that passage where Cain is said to have gone out from the presence of the Lord, the Bishop observes that if Cain after this turned a downright idolater, as many think, it is very likely he introduced the worship of the sun, as the best resemblance he could find of the glory of the Lord, which was wont to appear in a flaming light. It would be endless to enumerate all the passages of Holy Scripture which confirm and illustrate this notion, or represent the Deity as appearing and operating by fire; the misconstruction of which might possibly have misled the Gnostics, Basilidians, and other ancient heretics into an opinion that Jesus Christ was the visible corporeal sun.

188 We have seen that in the most remote ages and countries, the vulgar as well as the learned, the institutions of lawgivers as well as the reasonings of philosophers, have ever considered the element of fire in a peculiar light, and treated it with more than common regard, as if it were something of a very singular and extraordinary nature. Nor are there wanting authors of principal account among the moderns who entertain like notions concerning fire, especially among those who are most conversant in that element, and should seem best acquainted with it.

189 Mr. Homberg, the famous modern chemist, who brought that art to so great perfection, holds[2] the substance of light or fire to be the true chemic principle sulphur (Sect. 129), and to extend itself throughout the whole universe. It is his opinion that this is the only active principle; that mixed with various things it formeth several sorts of natural productions, with salts making oil, with earth bitumen, with mercury metal; that this principle of sulphur, fire, or the substance of light, is in itself imperceptible, and only becomes sensible as it is joined with some other principle, which serves as a vehicle for it; that, although it be the most active of all things, yet it is at the same time the most firm bond and cement to combine and hold the principles together, and give form to the mixed bodies; and that in the analysis of

[1] [Simon Patrick (1626–1707), Bishop of Ely. A voluminous writer. The text probably refers to his long-valued Commentary on the Old Testament (14 vols., 1695 ff.)—Ed.] [2] [*Hist. de l'Acad. R. des Sciences*, année 1705, p. 88. On Homberg see note on Sect. 126.—Ed.]

bodies it is always lost, escaping the skill of the artist, and passing through the closest vessels.

190 Boerhaave,[1] Nieuwentyt, and divers other moderns are in the same way of thinking. They with the ancients distinguish a pure elementary invisible fire from the culinary, or that which appears in ignited bodies (Sects. 163, 166). This last they will not allow to be pure fire. The pure fire is to be discerned by its effects alone, such as heat, dilatation of all solid bodies, and rarefaction of fluids, the segregating heterogeneous bodies, and congregating those that are homogeneous. That therefore which smokes and flames is not pure fire, but that which is collected in the focus of a mirror or burning glass. This fire seems the source of all the operations in nature; without it nothing either vegetates or putrefies, lives or moves or ferments, is dissolved or compounded or altered, throughout this whole natural world in which we subsist. Were it not for this, the whole would be one great stupid inanimate mass. But this active element is supposed to be everywhere, and always present, imparting different degrees of life, heat, and motion to the various animals, vegetables, and other natural productions, as well as to the elements themselves wherein they are produced and nourished.

191 As water acts upon salt, or *aqua fortis* upon iron, so fire dissolves all other bodies. Fire, air, and water are all three menstruums: but the two last seem to derive all their force and activity from the first (Sect. 149). And indeed there seems to be, originally or ultimately, but one menstruum in nature, to which all other menstruums may be reduced. Acid salts are a menstruum, but their force and distinct powers are from sulphur.[2] Considered as pure, or in themselves, they are all of the same nature. But, as obtained by distillation, they are constantly joined with some sulphur, which characterizeth and cannot be separated from them. This is the doctrine of Monsieur Homberg. But what is it that characterizeth or differenceth the sulphurs themselves? If sulphur be the substance of light, as that author will have it, whence is it that animal, vegetable, and metallic

l 12 *mirror*—(*E errata*) *concave mirror.*

[1] [*El. chem.* (1732), VOL. I, p. 284. On Boerhaave see note on Sect. 42. Bernard Nieuwentijdt (1654-1718), a Dutch mathematician, is mentioned in Berkeley's early essay 'Of Infinites' (in VOL. IV of the present edition, p. 236). See his *Religious Philosopher* (Eng. trans., 1718–19, VOL. II, pp. 612 f., 404, and iii, 772). The Stoic distinction between solar and common fire is expounded in Cicero, *De nat. deorum*, II, 15.—Ed.] [2] [See Sect. 129.—Ed.]

sulphurs impart different qualities to the same acid salt? Can this be explained upon Homberg's principles? And are we not obliged to suppose that light, separated by the attracting and repelling powers in the strainers, ducts, and pores of those bodies, forms several distinct kinds of sulphur, all which, before such separation, were lost and blended together, in one common mass of light or fire, seemingly homogeneous?

192 In the analysis of inflammable bodies, the fire or sulphur is lost, and the diminution of weight sheweth the loss (Sect. 169[1]). Oil is resolved into water, earth, and salt, none of which is inflammable. But the fire or *vinculum* which connected those things, and gave the form of oil, escapes from the artist. It disappears but is not destroyed. Light or fire imprisoned made part of the compound, gave union to the other parts, and form to the whole. But having escaped, it mingles with the general ocean of æther, till, being again parted and attracted, it enters and specificates some new subject of the animal, vegetable, or mineral kingdom. Fire, therefore, in the sense of philosophers, is also fire, though not always flame.

193 Solar fire or light, in calcining certain bodies, is observed to add to their weight. There is therefore no doubt but light can be fixed, and enter the composition of a body. And though it should lie latent for a long time, yet, being set free from its prison, it shall still shew itself to be fire. Lead, tin, or regulus of antimony, being exposed to the fire of a burning-glass, though they lose much in smoke and steam, are nevertheless found to be considerably increased in weight, which proves the introduction of light or fire into their pores. It is also observed that urine produceth no phosphorus unless it be long exposed to the solar light. From all which it may be concluded, that bodies attract and fix the light; whence it should seem, as some have observed, that fire without burning is an ingredient in many things, as water without wetting.

194 Of this there cannot be a better proof than the experiment of Monsieur Homberg, who made gold of mercury by introducing light into its pores, but at such trouble and expense that I suppose nobody will try the experiment for profit. By this junction of light and mercury both bodies became fixed, and

l 5 *forms*—(*A*, *B*, *E*) *doth form.* *l* 19 *also*—(*A*, *B*, *E*) *always.* *l* 30 *attract*—(*A*, *B*) *do attract.*

[1] [This seems to be misplaced; it belongs to the first sentence of the next section.—Ed.]

produced a third different from either, to wit, real gold. For the truth of which fact I refer to the Memoirs of the French Academy of Sciences.[1] From the foregoing experiment it appears that gold is only a mass of mercury penetrated and cemented by the substance of light, the particles of those bodies attracting and fixing each other. This seems to have been not altogether unknown to former philosophers; Marsilius Ficinus,[2] the Platonist, in his commentary on the first book of the second *Ennead* of Plotinus, and others likewise before him, regarding mercury as the mother, and sulphur as the father of metals; and Plato himself, in his *Timæus*,[3] describing gold to be a dense fluid with a shining yellow light, which well suits a composition of light and mercury.

195 Fire or light mixeth with all bodies (Sect. 157), even with water; witness the flashing lights in the sea, whose waves seem frequently all on fire. Its operations are various according to its kind, quantity, and degree of vehemence. One degree keeps water fluid, and another turns it into elastic air (Sect. 149). And air itself seems to be nothing else but vapours and exhalations, rendered elastic by fire. Nothing flames but oil, and sulphur with water, salt, and earth compose oil, which sulphur is fire: therefore fire enclosed attracts fire, and causeth the bodies whose composition it enters to burn and blaze.

196 Fire collected in the focus of a glass operates *in vacuo*, and therefore is thought not to need air to support it. Calx of lead[4] hath gone off with an explosion *in vacuo*, which Nieuwentyt and others take for a proof that fire can burn without air. But Mr. Hales[5] atributes this effect to air enclosed in the red lead, and perhaps too in the receiver, which cannot be perfectly exhausted. When common lead is put into the fire in order to make red lead, a greater weight of this comes out than was put in of common lead. Therefore the red lead should seem impregnated with fire. Mr. Hales thinks it is with air. The vast expansion of compound *aqua fortis*, Mr. Nieuwentyt will have to proceed from fire alone. Mr. Hales contends that air must necessarily co-operate. Though, by Nieuwentyt's experiment, it

[1] [Année 1706 (Homberg's article 'Suite de l'article trois des Essais de Chimie'), p. 267.—Ed.] [2] [Marsiglio Ficino (1433–99), the Neoplatonist of Florence: Comment. on *Enneads*, II, i (*Plotini Opera*, ed. Creuzer, 1835, VOL. I, p. 174[a]) —Ed.] [3] [59 B.—Ed.] [4] [Oxide of lead. See Nieuwentijdt's *Religious Philosopher*, Contemplation XXI, Sect. 12 (1718–19, VOL. II, p. 603).—Ed.] [5] [Stephen Hales (see below, p. 203), *Statical Essays* (1733), ch. 6 (3rd edn., 1738, VOL. I, pp. 289 f.)—Ed.]

should seem the phosphorus burns equally with and without air.

197 Perhaps they who hold the opposite sides in this question may be reconciled by observing that air is in reality nothing more than particles of wet and dry bodies volatilized and rendered elastic by fire (Sects. 147, 150, 151). Whatever, therefore, is done by air must be ascribed to fire; which fire is a subtle invisible thing, whose operation is not to be discerned but by means of some grosser body, which serves not for a pabulum to nourish the fire,[1] but for a vehicle to arrest and bring it into view—which seems the sole use of oil, air, or any other thing that vulgarly passeth for a pabulum or food of that element.

198 To explain this matter more clearly, it is to be observed that fire, in order to become sensible, must have some subject to act upon. This, being penetrated and agitated by fire, affects us with light, heat, or some other sensible alteration. And this subject so wrought upon may be called culinary fire. In the focus of a burning-glass exposed to the sun, there is real actual fire, though not discerned by the sense till it hath somewhat to work on, and can shew itself in its effects, heating, flaming, melting, and the like. Every ignited body is, in the foregoing sense, culinary fire. But it will not therefore follow that it is convertible into pure elementary fire. This, for aught that appears, may be ingenerable and incorruptible by the course of nature.[2] It may be fixed and imprisoned in a compound (Sects. 169, 192, 193), and yet retain its nature, though lost to sense, and though it return into the invisible elementary mass, upon the analysis of the compounded body: as is manifest in the solution of stone-lime by water.

199 It should seem, therefore, that what is said of air's being the pabulum of fire, or being converted into fire, ought to be understood only in this sense: to wit, that air, being less gross than other bodies, is of a middle nature and therefore more fit to receive the impressions of a fine æthereal fire (Sect. 163), and impart them to other things. According to the ancients, soul serveth for a vehicle to intellect[3] (Sect. 178), and light or fire for a

[1] [Boerhaave attacks the view that elemental fire needs a 'pabulum' (*El. chem.*, 1732, VOL. I, pp. 286, 310, 353 f.). Cp. Cicero, *De nat. deorum*, II, 15, quoting from Chrysippus: 'Nullus ignis sine pastu aliquo possit permanere.' —Ed.] [2] Boerhaave, *op. cit.*, I. p. 203.—Ed.] [3] [Plato, *Timaeus*, 30 B, and reference in note on Sect. 178.—Ed.]

vehicle to the soul; and, in like manner, air may be supposed a vehicle to fire, fixing it in some degree, and communicating its effects to other bodies.

200 The pure invisible fire or æther doth permeate all bodies, even the hardest and most solid, as the diamond. This alone, therefore, cannot, as some learned men have supposed, be the cause of muscular motion, by a mere impulse of the nerves communicated from the brain to the membranes of the muscles, and thereby to the enclosed æther, whose expansive motion, being by that means increased, is thought to swell the muscles and cause a contraction of the fleshy fibres. This, it should seem, the pure æther cannot do immediately and of itself, because, supposing its expansive motion to be increased, it must still pass through the membranes, and consequently not swell them, inasmuch as æther is supposed freely to pervade the most solid bodies. It should seem, therefore, that this effect must be owing, not to pure æther, but to æther in some part fixed and arrested by the particles of air.

201 Although this æther be extremely elastic, yet, as it is sometimes found by experience to be attracted, imprisoned, and detained in gross bodies (Sect. 169), so we may suppose it to be attracted, and its expansive force diminished, though it should not be quite fixed, by the loose particles of air, which combining and cohering therewith may bring it down, and qualify it for intercourse with grosser things. Pure fire may be said to animate air, and air other things. Pure fire is invisible; therefore flame is not pure fire. Air is necessary both to life and flame. And it is found by experiment that air loseth in the lungs the power of feeding flame. Hence it is concluded that the same thing in air contributes both to life and flame. Vital flame survives culinary flame *in vacuo:* therefore it requires less of that thing to sustain it.

202 What this may be, whether some certain proportion, or some peculiar parts, of æther, is not easy to say. But thus much seems plain, that whatever is ascribed to acid may be also ascribed to fire or æther. The particles of æther fly asunder with the greatest force: therefore, agreeably to Sir Isaac Newton's doctrine, when united they must attract each other with the greatest force. Therefore they constitute the acid. For whatsoever strongly attracts and is attracted, may be called an acid, as Sir Isaac Newton informs us in his tract *De Acido.* Hence it should seem that the sulphur of Homberg and the acid of Sir Isaac are at bottom one and the same thing, to wit, pure fire or æther.[1]

[1] [See Sect. 129 f.—Ed.]

203 The vital flame or æthereal spirit, being attracted and imprisoned in grosser bodies, seemeth to be set free and carried off by the superior attraction of a subtle and pure flame. Hence perhaps it is that lightning kills animals, and turns spirituous liquors vapid in an instant.

204 Hippocrates, in his book *Concerning the Heart*,[1] observeth that the soul of man is not nourished by meats and drinks from the lower belly, but by a pure and luminous substance darting its rays, and distributing a non-natural nourishment, as he terms it, in like manner as that from the intestines is distributed to all parts of the body. This luminous non-natural nourishment, though it be secreted from the blood, is expressly said not to come from the lower belly. It is plain, therefore, he thought it came into the blood either by respiration, or by attraction through the pores. And it must be acknowledged that somewhat igneous or æthereal, brought by the air into the blood, seems to nourish, though not the soul itself, yet the interior tunicle of the soul, the *auraï simplicis ignem.*[2]

205 That there is really such a thing as vital flame, actually kindled, nourished, and extinguished like common flame, and by the same means, is an opinion of some moderns, particularly of Dr. Willis[3] in his tract *De Sanguinis Accensione*; that it requires constant eventilation, through the trachea and pores of the body, for the discharge of a fuliginous and excrementitious vapour; and that this vital flame, being extremely subtle, might not be seen any more than shining flies or *ignes fatui* by daylight. And yet it hath sometimes become visible on divers persons, of which there are undoubted instances. This is Dr. Willis's notion: and perhaps there may be some truth in this, if it be so understood as that light or fire might indeed constitute the animal spirit or immediate vehicle of the soul.

206 There have not been wanting those who, not content to suppose light the most pure and refined of all corporeal beings, have gone farther, and bestowed upon it some attributes of a yet higher nature. Julianus,[4] the Platonic philosopher, as cited by Ficinus, saith it was a doctrine in the theology of the Phœnicians that there is diffused throughout the universe a pellucid and

[1] [*De Corde*, VIII.—Ed.] [2] [From the quotation in Sect. 171.—Ed.] [3] [Thomas Willis (1621–75), F.R.S., physician. The '*De sang access.*' was appended to his *Affectionum quae dicuntur hystericae et hypochondriacae pathologia* (1670).—Ed.] [4] [The Neoplatonist Emperor, Julian the Apostate (332–63): *Orations*, IV ('To King Helios').—Ed.]

shining nature, pure and impassive, the act of a pure intelligence. And Ficinus himself[1] undertakes to prove that light is incorporeal by several arguments: because it enlightens and fills a great space in an instant, and without opposition; because several lights meet without resisting each other; because light cannot be defiled by filth of any kind; because the solar light is not fixed in any subject; lastly, because it contracts and expands itself so easily without collision, condensation, rarefaction, or delay throughout the vastest space. These reasons are given by Ficinus in his comment on the first book of the second *Ennead* of Plotinus.

207 But it is now well known that light moves; that its motion is not instantaneous; that it is capable of condensation, rarefaction, and collision; that it can be mixed with other bodies, enter their composition, and increase their weight (Sects. 169, 192, 193). All which seems sufficiently to overthrow those arguments of Ficinus, and shew light to be corporeal. There appears indeed some difficulty at first sight about the non-resistance of rays or particles of light occurring one to another, in all possible directions or from all points. Particularly if we suppose the hollow surface of a large sphere studded with eyes looking inwards one at another, it may perhaps seem hard to conceive how distinct rays from every eye should arrive at every other eye without jostling, repelling, and confounding each other.

208 But these difficulties may be got over by considering, in the first place, that visible points are not mathematical points,[2] and consequently that we are not to suppose every point of space a radiating point. Secondly, by granting that many rays do resist and intercept each other, notwithstanding which the act of vision may be performed. Since as every point of the object is not seen, so it is not necessary that rays from every such point arrive at the eye. We often see an object, though more dimly, when many rays are intercepted by a gross medium.

209 Besides, we may suppose the particles of light to be indefinitely small, that is, as small as we please, and their aggregate to bear as small a proportion to the void as we please, there being nothing in this that contradicts the phenomena. And there needs nothing more in order to conceive the possibility of

[1] [In *Plotini Opera*, ed. Creuzer, 1835, VOL. I, p. 168*a*.—Ed.] [2] [As Berkeley has emphasized in his *Essay on Vision*, Sect. 54, and *Principles*, Sects. 123 ff. —Ed.]

rays passing from and to all visible points, although they be not incorporeal. Suppose a hundred ports placed round a circular sea, and ships sailing from each port to every other; the larger the sea, and the smaller the vessels are supposed, the less danger will there be of their striking against each other. But as there is by hypothesis no limited proportion between the sea and the ships, the void and solid particles of light, so there is no difficulty that can oblige us to conclude the sun's light incorporeal from its free passage; especially when there are so many clear proofs of the contrary. As for the difficulty, therefore, attending the supposition of a sphere studded with eyes looking at each other, this is removed only by supposing the particles of light exceeding small relatively to the empty spaces.

210 Plotinus[1] supposeth that from the sun's light, which is corporeal, there springs forth another equivocal light which is incorporeal, and as it were the brightness of the former. Marcilius Ficinus[2] also, observing it to be a doctrine in the *Timæus* of Plato[3] that there is an occult fire or spirit diffused throughout the universe, intimates that this same occult invisible fire or light is, as it were, the sight of the mundane soul. And Plotinus in his fourth *Ennead*[4] sheweth it to be his opinion that the world seeth itself and all its parts. The Platonic philosophers do wonderfully refine upon light, and soar very high—from coal to flame; from flame to light; from this visible light to the occult light of the celestial or mundane soul, which they supposed to pervade and agitate the substance of the universe by its vigorous and expansive motion.

211 If we may believe Diogenes Laertius,[5] the Pythagorean philosophers thought there was a certain pure heat or fire, which had somewhat divine in it, by the participation whereof men became allied to the gods. And according to the Platonists, heaven is not defined so much by its local situation as by its purity. The purest and most excellent fire, that is heaven, saith Ficinus.[6] And again, the hidden fire that everywhere exerts itself, he calls celestial. He represents fire as most powerful and active, dividing all things, abhorring all composition or mixture

[1] [*Enneads*, II. i, 7.—Ed.] [2] [Comment. *in loco* (Creuzer, VOL. I, p. 175*a*) —Ed.] [3] [34 B.—Ed.] [4] [IV. v, 8.—Ed.] [5] [VIII, 27. The Stoics called their Aether divine (Cicero, *De nat. deorum*, I, 14 f.); so also did Euripides (quoted ibid., II, 25).—Ed.] [6] [Comment. on *Enneads*, II, i (Creuzer, VOL. I, p. 174*b*).—Ed.]

with other bodies; and, as soon as it goes free, relapsing instantly into the common mass of celestial fire, which is everywhere present and latent.

212 This is the general source of life, spirit, and strength, and therefore of health to all animals, who constantly receive its illapses clothed in air, through the lungs and pores of the body. The same spirit, imprisoned in food and medicines, is conveyed into the stomach, the bowels, the lacteals, circulated and secreted by the several ducts, and distributed throughout the system (Sects. 37, 42, 44). Plato, in his *Timæus*,[1] enumerating the ignited juices, names wine in the first place, and tar in the second. But wine is pressed from the grape, and fermented by human industry. Therefore of all ignited juices purely natural, tar or resin must in his account be esteemed the first.

213 The vivifying luminous æther exists in all places, even the darkest caverns ; as is evident from hence, that many animals see in those dark places, and that fire may be kindled in them by the collision or attrition of bodies. It is also known that certain persons have fits of seeing in the dark. Tiberius was said to have had this faculty or distemper.[2] I myself knew an ingenious man who had experienced it several times in himself. And Dr. Willis,[3] in his tract *De Sanguinis Accensione*, mentions another of his own knowledge. This luminous æther or spirit is therefore said by Virgil to nourish or cherish the innermost earth, as well as the heavens and celestial bodies.

> Principio cœlum ac terras, camposque liquentes,
> Lucentemque globum Lunæ, Titaniaque astra
> Spiritus intus alit.[4]

214 The principles of motion and vegetation in living bodies seem to be delibations from the invisible fire or spirit of the universe (Sects. 43, 157, 164, 171), which, though present to all things, is not nevertheless one way received by all, but variously imbibed, attracted, and secreted, by the fine capillaries and exquisite strainers in the bodies of plants and animals, whereby it becomes mixed and detained in their juices.

215 It hath been thought by some observers of nature that the fine glandular vessels admit from the common mass of the blood only such juices as are homogeneous to those with which they were originally imbued. How they came to be so imbued

[1] [60 A.—Ed.] [2] [Suetonius, ch. 68.—Ed.] [3] [See note on Sect. 205.—Ed.]
[4] [*Aeneid*, VI, 724–6.—Ed.]

doth not appear. But thus much is plain, that fine tubes attract fluids, that the glands are fine tubes, and that they attract very different juices from the common mass. The same holds also with regard to the capillary vessels of vegetables (Sects. 30, 31, 33, 35), it being evident that, through the fine strainers in the leaves and all over the body of the plant, there be juices or fluids of a particular kind drawn in, and separated from the common mass of air and light; and that the most elaborate spirit, whereon the character or distinguishing virtue and properties of the plant depend, is of a luminous (Sects. 37, 43) and volatile nature, being lost or escaping into air or æther, from essential oils and odoriferous waters, without any sensible diminution of the subject.

216 As different kinds of secreted light or fire produce different essences, virtues, or specific properties, so also different degrees of heat produce different effects. Thus, one degree of heat keeps the blood from coagulating, and another degree coagulates the blood. Thus, a more violent fire hath been observed to set free and carry off that very light which a more moderate fire had introduced and fixed in the calcined regulus of antimony. In like manner, one kind or quantity of this æthereal fiery spirit may be congenial and friendly to the spirits of a man, while another may be noxious.

217 And experience sheweth this to be true. For the fermented spirit of wine or other liquors produceth irregular motions, and subsequent depressions in the animal spirits; whereas the luminous spirit lodged and detained in the native balsam of pines and firs is of a nature so mild, and benign, and proportioned to the human constitution, as to warm without heating, to cheer but not inebriate,[1] and to produce a calm and steady joy like the effect of good news, without that sinking of spirits which is a subsequent effect of all fermented cordials. I may add, without all other inconvenience, except that it may like any other medicine be taken in too great a quantity for a nice stomach: in which case it may be right to lessen the dose, or to take it only once in the four and twenty hours, empty, going to bed (when it is found to be least offensive), or even to suspend the taking of it for a

l 12 *the subject*—(*E*) *them.* *l* 33 *a nice*—(*A*, *B*) *too nice a.*

[1] [Probably the source of Cowper's now proverbial words in *The Task* (1785), BK. IV, 38–40:

> And while the bubbling and loud hissing urn
> Throws up a steamy column, and the cups
> That cheer but not inebriate wait on each.—Ed.]

time, till nature shall seem to crave it, and rejoice in its benign and comfortable spirit.

218 Tar-water, serving as a vehicle to this spirit, is both diuretic and diaphoretic, but seems to work its principal effect by asssisting the *vis vitæ*, as an alterative and cordial, enabling nature, by an accession of congenial spirit, to assimilate that which could not be assimilated by her proper force, and so to subdue the *fomes morbi*.[1] And this should seem in most cases the best and safest course. Great evacuations weaken nature as well as the disease. And it is to be feared that they who use salivations and copious bleedings may, though they should recover of the distemper, in their whole life be never able to recover of the remedies.

219 It is true, indeed, that in chronical cases there is need of time to complete a cure; and yet I have known this tar-water in disorders of the lungs and stomach to prove a very speedy remedy, and to allay the anxiety and heat of a fever in an instant, giving ease and spirits to the patient. This I have often experienced, not without surprise at seeing these salutary effects follow so immediately in a fever on taking a glass of tar-water. Such is the force of these active vivifying principles contained in this balsam.

220 Force or power, strictly speaking, is in the Agent alone who imparts an equivocal force to the invisible elementary fire, or animal spirit of the world (Sects. 153, 156, 157), and this to the ignited body or visible flame, which produceth the sense of light and heat. In this chain the first and last links are allowed to be incorporeal: the two intermediate are corporeal, being capable of motion, rarefaction, gravity, and other qualities of bodies. It is fit to distinguish these things, in order to avoid ambiguity concerning the nature of fire.

221 Sir Isaac Newton in his *Optics*[2] asks, 'Is not fire a body heated so hot as to emit light copiously? For what else', adds he, 'is a red-hot iron than fire?' Now, it should seem that to define fire by heat would be to explain a thing by itself. A body heated so hot as to emit light is an ignited body, that is, hath fire in it, is penetrated and agitated by fire, but is not itself fire. And although it should in the third foregoing acceptation, or vulgar sense, pass for fire, yet it is not the pure elementary fire (Sect. 190) in the second or philosophic sense, such as was understood

[1] [Whatever in the body contains the cause of the disease.—Ed.] [2] [BK. III, qu. 9.—Ed.]

by the sages of antiquity, and such as is collected in the focus of a burning-glass ; much less is it the *vis*, force, or power of burning, destroying, calcining, melting, vitrifying, and raising the perceptions of light and heat. This is truly and really in the incorporeal Agent, and not in the vital spirit of the universe. Motion, and even power in an equivocal sense, may be found in this pure æthereal spirit, which ignites bodies, but is not itself the ignited body, being an instrument or medium (Sect. 160) by which the real Agent doth operate on grosser bodies.

222 It hath been shewn in Sir Isaac Newton's *Optics*[1] that light is not reflected by impinging on bodies, but by some other cause. And to him it seems probable that as many rays as impinge on the solid parts of bodies are not reflected, but stifled and retained in the bodies. And it is certain the great porosity of all known bodies affords room for much of this light or fire to be lodged therein. Gold itself, the most solid of all metals, seems to have far more pores than solid parts, from water being pressed through it in the Florentine experiment, from magnetic effluvia passing, and from mercury entering, its pores so freely. And it is admitted that water, though impossible to be compressed, hath at least forty times more pores than solid parts. And as acid particles, joined with those of earth in certain proportions, are so closely united with them as to be quite hid and lost to all appearance, as in *mercurius dulcis* and common sulphur, so also may we conceive the particles of light or fire to be absorbed and latent in grosser bodies.

223 It is the opinion of Sir Isaac Newton[2] that somewhat unknown remains *in vacuo*, when the air is exhausted. This unknown medium he calls æther. He supposeth it to be more subtle in its nature, and more swift in its motion, than light, freely to pervade all bodies, and by its immense elasticity to be expanded throughout all the heavens. Its density is supposed greater in free and open spaces than within the pores of compact bodies. And in passing from the celestial bodies to great distances, it is supposed to grow denser and denser continually, and thereby cause those great bodies to gravitate towards one another, and their respective parts towards their centres, every body endeavouring to pass from the denser parts of the medium towards the rarer.

224 The extreme minuteness of the parts of this medium, and the velocity of their motion, together with its gravity, density,

[1] [BK. II, PT. III, prop. 8.—Ed.] [2] [*Optics*, BK. III, qu. 18.—Ed.]

and elastic force, are thought to qualify it for being the cause of all the natural motions in the universe. To this cause are ascribed the gravity and cohesion of bodies. The refraction of light is also thought to proceed from the different density and elastic force of this æthereal medium in different places. The vibrations of this medium, alternately concurring with or obstructing the motions of the rays of light, are supposed to produce the fits of easy reflection and transmission. Light by the vibrations of this medium is thought to communicate heat to bodies. Animal motion and sensation are also accounted for by the vibrating motions of this æthereal medium, propagated through the solid capillaments of the nerves. In a word, all the phenomena and properties of bodies that were before attributed to attraction, upon later thoughts seem ascribed to this æther, together with the various attractions themselves.

225 But, in the philosophy of Sir Isaac Newton,[1] the fits (as they are called) of easy transmission and reflection seem as well accounted for by vibrations excited in bodies by the rays of light, and the refraction of light by the attraction of bodies. To explain the vibrations of light by those of a more subtle medium seems an uncouth explication. And gravity seems not an effect of the density and elasticity of æther, but rather to be produced by some other cause: which Sir Isaac himself insinuates to have been the opinion even of those ancients who took vacuum, atoms, and the gravity of atoms, for the principles of their philosophy, tacitly attributing (as he well observes) gravity to some other cause distinct from matter, from atoms, and consequently from that homogeneous æther or elastic fluid. The elasticity of which fluid is supposed to depend upon, to be defined and measured by, its density; and this by the quantity of matter in one particle, multiplied by the number of particles contained in a given space; and the quantity of matter in any one particle or body of a given size to be determined by its gravity. Should not therefore gravity seem the original property and first supposed? On the other hand, if force be considered as prescinded from gravity and matter, and as existing only in points or centres, what can this amount to but an abstract, spiritual, incorporeal force?

226 It doth not seem necessary, from the phenomena, to suppose any medium more active and subtle than light or fire.

l 8 *and—(A, B) or.* *l* 32 *or body of a given size (not in E).*

[1] [*Optics*, BK. III, qu. 28.—Ed.]

Light being allowed to move at the rate of about ten millions of miles in a minute, what occasion is there to conceive another medium of still smaller and more moveable parts? Light or fire seems the same with æther. So the ancients understood, and so the Greek word implies. It pervades all things (Sect. 157), is everywhere present. And this same subtle medium, according to its various quantities, motions, and determinations, sheweth itself in different effects or appearances, and is æther, light, or fire.

227 The particles of æther fly asunder with the greatest force; therefore when united they must (according to the Newtonian doctrine) attract each other with the greatest force; therefore they are acids, or constitute the acid (Sect. 130); but this united with earthy parts maketh alkali, as Sir Isaac teacheth in his tract *De Acido*;[1] alkali, as appears in cantharides and lixivial salts, is a caustic; caustics are fire; therefore acid is fire: therefore æther is fire; and if fire, light. We are not therefore obliged to admit a new medium distinct from light, and of a finer and more exquisite substance, for the explication of phenomena which appear to be as well explained without it. How can the density or elasticity of æther account for the rapid flight of a ray of light from the sun, still swifter as it goes farther from the sun? Or how can it account for the various motions and attractions of different bodies? Why oil and water, mercury and iron, repel, or why other bodies attract each other? Or why a particle of light should repel on one side and attract on the other, as in the case of the Icelandic crystal?[2] To explain cohesion by hamate atoms is accounted *ignotum per ignotius*. And is it not as much so to account for the gravity of bodies by the elasticity of æther?

228 It is one thing to arrive at general laws of nature from a contemplation of the phenomena, and another to frame an hypothesis, and from thence deduce the phenomena. Those who supposed epicycles, and by them explained the motions and appearances of the planets, may not therefore be thought to have discovered principles true in fact and nature. And, albeit we may from the premises infer a conclusion, it will not follow that we can argue reciprocally, and from the conclusion infer the premises.

l 4 *seems*—(*E*) *seem.* *l* 33 *supposed*—(*E*) *suppose.* *l* 33 *explained*—(*E*) *explain.*

[1] [*De natura acidorum* (*Works*, ed. Horsley, 1779–82, VOL. IV, pp. 397–400).—Ed.]
[2] [Iceland Spar. The reference is again to *Optics*, BK. III, qu. 28. On 'cohesion by hamate atoms,' see Sect. 132.—Ed.]

For instance, supposing an elastic fluid, whose constituent minute particles are equidistant from each other, and of equal densities and diameters, and recede one from another with a centrifugal force which is inversely as the distance of the centres; and admitting that from such supposition it must follow that the density and elastic force of such fluid are in the inverse proportion of the space it occupies when compressed by any force; yet we cannot reciprocally infer that a fluid endued with this property must therefore consist of such supposed equal particles; for it would then follow that the constituent particles of air were of equal densities and diameters; whereas it is certain that air is a heterogeneous mass, containing in its composition an infinite variety of exhalations, from the different bodies which make up this terraqueous globe.

229 The phenomena of light, animal spirit, muscular motion, fermentation, vegetation, and other natural operations, seem to require nothing more than the intellectual and artificial[1] fire of Heraclitus, Hippocrates, the Stoics (Sects. 166, 168), and other ancients. Intellect, superadded to æthereal spirit, fire, or light, moves, and moves regularly, proceeding in a method, as the Stoics, or increasing and diminishing by measure, as Heraclitus expressed it. The Stoics held that fire comprehended and included the spermatic reasons or forms (λόγους σπερματικούς) of all natural things.[2] As the forms of things have their ideal existence in the intellect, so it should seem that seminal principles have their natural existence in the light (Sect. 164), a medium consisting of heterogeneous parts, differing from each other in divers qualities that appear to sense, and not improbably having many original properties, attractions, repulsions, and motions, the laws and natures whereof are indiscernible to us otherwise than in their remote effects. And this animated heterogeneous fire should seem a more adequate cause, whereby to explain the phenomena of nature, than one uniform æthereal medium.

230 Aristotle, indeed, excepts against the elements being animated. Yet nothing hinders why that power of the soul styled by him κινητική, or locomotive, may not reside therein, under the direction of an Intellect, in such sense and as properly as it is said to reside in animal bodies. It must nevertheless be

[1] [Operating as if by rules of art. Cp. Cicero, *De nat. deorum*, II, 22 (57): 'Zeno naturam definit . . . ignem esse artificiosum.'—Ed.] [2] [Diogenes Laertius, VII, 136 and 139.—Ed.]

owned that albeit that philosopher acknowledgeth a divine force or energy in fire, yet to say that fire is alive, or that having a soul it should not be alive, seem to him equally absurd.[1] See his second book *De Partibus Animalium.*

231 The laws of attraction and repulsion are to be regarded as laws of motion; and these only as rules or methods observed in the productions of natural effects, the efficient and final causes whereof are not of mechanical consideration.[2] Certainly, if the explaining a phenomenon be to assign its proper efficient and final cause (Sects. 154, 155, 160), it should seem the mechanical philosophers never explained anything; their province being only to discover the laws of nature, that is, the general rules and methods of motion, and to account for particular phenomena by reducing them under, or shewing their conformity to, such general rules.

232 Some corpuscularian philosophers of the last age have indeed attempted to explain the formation of this world and its phenomena by a few simple laws of mechanism. But if we consider the various productions of nature, in the mineral, vegetable, and animal parts of the creation, I believe we shall see cause to affirm that not any one of them has hitherto been, or can be, accounted for on principles merely mechanical; and that nothing could be more vain and imaginary than to suppose with Descartes[3] that merely from a circular motion's being impressed by the supreme Agent on the particles of extended substance, the whole world, with all its several parts, appurtenances, and phenomena, might be produced by a necessary consequence from the laws of motion.

233 Others suppose that God did more at the beginning, having then made the seeds of all vegetables and animals, containing their solid organical parts in miniature, the gradual filling and evolution of which, by the influx of proper juices, doth constitute the generation and growth of a living body. So that the artificial structure of plants and animals daily generated requires no present exercise of art to produce it, having been already framed at the origin of the world, which with all its parts

l 24 *a circular motion's*—(*A*, *B*) *circular motions.*

[1] [*De anima*, I, 5 (411^a, 14). The passage in *De part. an.* seems to be II, 7 (652^b, 13).—Ed.] [2] [See Berkeley's *De motu*, Sects. 22, 35–7, 41 f.; cp. *Principles*, Sects. 62 and 107.—Ed.] [3] [*Principia philosophiae*, III, 30. —Ed.]

hath ever since subsisted, going like a clock [1] or machine by itself, according to the laws of nature, without the immediate hand of the artist. But how can this hypothesis explain the blended features of different species in mules and other mongrels? Or the parts added or changed, and sometimes whole limbs lost, by marking in the womb? Or how can it account for the resurrection of a tree from its stump, or the vegetative power in its cutting? In which cases we must necessarily conceive something more than the mere evolution of a seed.

234 Mechanical laws of nature or motion direct us how to act, and teach us what to expect. Where intellect presides there will be method and order, and therefore rules, which if not stated and constant would cease to be rules. There is therefore a constancy in things, which is styled the Course of Nature (Sect. 160). All the phenomena in nature are produced by motion. There appears a uniform working in things great and small, by attracting and repelling forces. But the particular laws of attraction and repulsion are various. Nor are we concerned at all about the forces, neither can we know or measure them otherwise than by their effects, that is to say, the motions; which motions only, and not the forces, are indeed in the bodies (Sect. 155). Bodies are moved to or from each other, and this is performed according to different laws. The natural or mechanic philosopher endeavours to discover those laws by experiment and reasoning. But what is said of forces residing in bodies, whether attracting or repelling, is to be regarded only as a mathematical hypothesis, and not as anything really existing in nature.[2]

235 We are not therefore seriously to suppose, with certain mechanic philosophers, that the minute particles of bodies have real forces or powers, by which they act on each other, to produce the various phenomena in nature. The minute corpuscles are impelled and directed, that is to say, moved to and from each other, according to various rules or laws of motion. The laws

l 7 *cutting*—(*A*, *B*, *E*) *cuttings.*

[1] [So Leibniz, in *A Collection of Papers between Leibniz and Clarke* (1717, pp. 4 and 30; *Opera*, ed. Erdmann, 1840, pp. 747^a and 749^a, cp. also pp. 133–5); the simile had also been used by Geulincx in his *Ethica*. As for the theory of preformation, Berkeley was not rejecting it outright, as is shown by Sects. 267 and 282f.; he was simply refusing it to restrict the activity of God to a once-for-all act of creation.—Ed.] [2] [See Berkeley's *De motu*, Sect. 17 (cp. 71). —Ed.]

of gravity, magnetism, and electricity are diverse. And it is not known what other different rules or laws of motion might be established by the Author of nature. Some bodies approach together, others fly asunder, and perhaps some others do neither.[1] When salt of tartar flows *per deliquium*,[2] it is visible that the particles of water floating in the air are moved towards the particles of salt, and joined with them. And when we behold vulgar salt not to flow *per deliquium*, may we not conclude that the same law of nature and motion doth not obtain between its particles and those of the floating vapours? A drop of water assumes a round figure, because its parts are moved towards each other. But the particles of oil and vinegar have no such disposition to unite. And when flies walk in water without wetting their feet, it is attributed to a repelling force or faculty in the fly's feet. But this is obscure, though the phenomenon be plain.

236 It is not improbable, and seems not unsupported by experiments, that as in algebra, where positive quantities cease there negative begin, even so in mechanics, where attracting forces cease there repelling forces begin; or (to express it more properly) where bodies cease to be moved towards, they begin to be moved from each other. This Sir Isaac Newton infers from the production of air and vapours, whose particles fly asunder with such vehement force. We behold iron move towards the loadstone, straws towards amber, heavy bodies towards the earth. The laws of these motions are various. And when it is said that all the motions and changes in the great world arise from attraction—the elasticity of the air, the motion of water, the descent of heavy and the ascent of light bodies, being all ascribed to the same principle; when from insensible attractions of most minute particles at the smallest distance are derived cohesion, dissolution, coagulation, animal secretion, fermentation, and all chemical operations; and when it is said that without such principles there never would have been any motion in the world, and without the continuance thereof all motion would cease; in all this we know or understand no more than that bodies are moved according to a certain order, and that they do not move themselves.

237 So likewise, how to explain all those various motions and effects by the density and elasticity of æther seems

l 15 *phenomenon*—(*E*) *phenomena.*

[1] [Berkeley had urged that gravity is not universal in *Principles*, Sect. 106. —Ed.] [2] [I.e. by absorbing moisture from the air.—Ed.]

incomprehensible (Sects. 153, 162). For instance, why should the acid particles draw those of water and repel each other? Why should some salts attract vapours in the air, and others not? Why should the particles of common salt repel each other, so as not to subside in water? Why should the most repellent particles be the most attractive upon contact? Or why should the repellent begin where the attractive faculty leaves off? These, and numberless other effects, seem inexplicable on mechanical principles, or otherwise than by recourse to a mind or spiritual agent (Sects. 154, 220). Nor will it suffice from present phenomena and effects, through a chain of natural causes and subordinate blind agents, to trace a divine Intellect as the remote original cause, that first created the world, and then set it a-going.[1] We cannot make even one single step in accounting for the phenomena without admitting the immediate presence and immediate action of an incorporeal Agent, who connects, moves, and disposes all things according to such rules, and for such purposes, as seem good to Him.

238 It is an old opinion, adopted by the moderns, that the elements and other natural bodies are changed each into other (Sect. 148). Now, as the particles of different bodies are agitated by different forces, attracting and repelling, or, to speak more accurately, are moved by different laws, how can these forces or laws be changed, and this change accounted for by an elastic æther? Such a medium—distinct from light or fire—seemeth not to be made out by any proof, nor to be of any use in explaining the phenomena. But if there be any medium employed as a subordinate cause or instrument in attraction, it would rather seem to be light (Sects. 152, 156); since, by an experiment of Mr. Boyle's,[2] amber, that shewed no sign of attraction in the shade, being placed where the sunbeams shone upon it, immediately attracted light bodies. Besides, it hath been discovered by Sir Isaac Newton,[3] and an admirable discovery it was, that light is a heterogeneous medium (Sects. 40, 181), consisting of particles endued with original distinct properties. And

[1] [In all his philosophical writings Berkeley rejects the deistic view of God as the temporally First Cause, the beginning of the natural series. For him God stands outside the series, determining it by continual action (cp. *Principles*, Sect. 46).—Ed.] [2] [In 'The Atmosphere of consistent Bodies' (*Philos. Works*, ed. Shaw, 2nd edn., 1738, VOL. I, p. 400); also in 'Memoirs for a General History of the Air' (*op. cit.* VOL. III, p. 52).—Ed.] [3] [*Optics*, BK. I, prop. 2.—Ed.]

upon these, if I may venture to give my conjectures, it seemeth probable the specific properties of bodies, and the force of specific medicines, may depend. Different sides of the same ray shall one approach and the other recede from the Icelandic crystal: can this be accounted for by the elasticity of a fine medium, or by the general laws of motion, or by any mechanical principles whatever? And if not, what should hinder but there may be specific medicines, whose operation depends not upon mechanical principles, how much soever that notion hath been exploded of late years?

239 Why may we not suppose certain idiosyncrasies, sympathies, oppositions, in the solids, or fluids, or animal spirit of a human body, with regard to the fine insensible parts of minerals or vegetables, impregnated by rays of light of different properties, not depending on the different size, figure, number, solidity, or weight of those particles, nor on the general laws of motion, nor on the density or elasticity of a medium, but merely and altogether on the good pleasure of the Creator, in the original formation of things? From whence divers unaccountable and unforeseen motions may arise in the animal economy; from whence also various peculiar and specific virtues may be conceived to arise, residing in certain medicines, and not to be explained by mechanical principles. For although the general known laws of motion are to be deemed mechanical, yet peculiar motions of the insensible parts, and peculiar properties depending thereon, are occult and specific.

240 The words attraction and repulsion may, in compliance with custom, be used where, accurately speaking, motion alone is meant. And in that sense it may be said that peculiar attractions or repulsions in the parts are attended with specific properties in the wholes. The particles of light are vehemently moved to or from, retained or rejected by, objects: which is the same thing as to say, with Sir Isaac Newton, that the particles of acids are endued with great attractive force (Sect. 202), wherein their activity consists; whence fermentation and dissolution; and that the most repellent are, upon contact, the most attracting particles.

241 Gravity and fermentation are received for two most extensive principles. From fermentation are derived the motion and warmth of the heart and blood in animals, subterraneous heat, fires, and earthquakes, meteors, and changes in the atmosphere. And that attracting and repelling forces operate in the

nutrition and dissolution of animal and vegetable bodies is the doctrine both of Hippocrates and Sir Isaac Newton. The former of these celebrated authors, in his treatise *Concerning Diet*[1] or *Regimen*, observes that in the nourishment of man, one part repels and another attracts. And again in the same treatise, two carpenters, saith he, saw a piece of timber: one draws, the other pushes: these two actions tend to one and the same end, though in a contrary direction, one up, the other down: this imitates the nature of man: πνεῦμα τὸ μὲν ἕλκει τὸ δὲ ὠθέει.[2]

242 It is the general maxim of Hippocrates that the manner wherein nature acts consisteth in attracting what is meet and good, and in repelling what is disagreeable or hurtful. He makes the whole of the animal economy to be administered by the faculties or powers of nature. Nature alone, saith he, sufficeth for all things to animals. She knows of herself what is necessary for them. Whence it is plain he means a conscious intelligent nature, that presides and moves the æthereal spirit. And though he declares all things are accomplished on man by necessity, yet it is not a blind fate or chain of mere corporeal causes, but a divine necessity, as he himself expressly calls it.[3] And what is this but an overruling intelligent power that disposeth of all things?

243 Attraction cannot produce, and in that sense account for, the phenomena, being itself one of the phenomena produced and to be accounted for (Sects. 160, 235). Attraction is performed by different laws, and cannot therefore in all cases be the effect of the elasticity of one uniform medium. The phenomena of electrical bodies, the laws and variations of magnetism, and, not to mention other kinds, even gravity, is not explained by elasticity, a phenomenon not less obscure than itself. But then, although it shews not the agent, yet it sheweth a rule and analogy in nature to say that the solid parts of animals are endued with attractive powers whereby from contiguous fluids they draw like to like; and that glands have peculiar powers attractive of peculiar juices (Sect. 41). Nature seems better known and explained by attractions and repulsions than by those other mechanical principles of size, figure, and the like; that is, by Sir Isaac Newton, than Descartes.[4] And natural philosophers excel, as they are more

[1] [*De diaeta*, I, 6.—Ed.] [2] [*Op. cit.*, I, 7 and 16.—Ed.] [3] [*Op. cit.*, I, 6 (per divinam necessitatem).—Ed.] [4] [In Sect. 232 Berkeley has rejected mechanism as a metaphysical theory. He is now concerned with it simply as an hypothesis within natural science, and as such prefers Newton's version of it to Descartes's —Ed.]

or less acquainted with the laws and methods observed by the Author of nature.

244 The size and shape of particles and general laws of motion can never explain the secretions without the help of attraction, obscure perhaps as to its cause, but clear as a law. Numberless instances of this might be given. Lémery the younger[1] thought himself obliged to suppose the particles of light or fire (contrary to all reason) to be of a very gross kind, even greater than the pores of the burnt limestone, in order to account for their being detained or imprisoned therein; but this phenomenon is easily reduced to attraction. There would be no end of enumerating the like cases. The activity and force of æthereal spirit or fire, by the laws of attraction, is imparted to grosser particles (Sects. 152, 163), and thereby wonderfully supports the economy of living bodies. By such peculiar compositions and attractions, it seems to be effected that denser fluids can pass where air itself cannot (as oil through leather), and therefore through the nicest and finest strainers of an animal or vegetable.

245 The ancients had some general conception of attracting and repelling powers as natural principles (Sects. 241, 242). Galileo had particularly considered the attraction of gravity, and made some discovery of the laws thereof. But Sir Isaac Newton, by his singular penetration, profound knowledge in geometry and mechanics, and great exactness in experiments, hath cast a new light on natural science.[2] The laws of attraction and repulsion were in many instances discovered, and first discovered, by him. He shewed their general extent, and therewith, as with a key, opened several deep secrets of nature, in the knowledge whereof he seems to have made a greater progress than all the sects of corpuscularians together had done before him. Nevertheless, the principle of attraction itself is not to be explained by physical or corporeal causes.

246 The Cartesians attempted to explain it by the nisus of a subtle element, receding from the centre of its motion, and impelling grosser bodies towards it. Sir Isaac Newton in his later thoughts seems (as was before observed) to have adopted

[1] [Physician and chemist, son of the more famous chemist Nicolas Lémery: died 1721. His chemical papers are in the *Mémoires de l'Académie*. Berkeley seems to be following Boerhaave (*El. chem.* VOL. I, p. 391: 'Ignis elementa minima inter omnia corpora nota.').—Ed.] [2] [Cp. Berkeley's early tribute to Newton in *Principles*, Sect. 110, text of 1st edn.—Ed.]

somewhat not altogether foreign from this notion, ascribing that to his elastic medium (Sects. 237, 238) which Descartes did to his second element. But the great men of antiquity resolved gravity into the immediate action of an intelligent incorporeal being. To which also Sir Isaac Newton himself attests and subscribes[1]; although he may perhaps sometimes be thought to forget himself in his manner of speaking of physical agents, which in a strict sense are none at all, and in supposing real forces to exist in bodies, in which, to speak truly, attraction and repulsion should be considered only as tendencies or motions, that is, as mere effects, and their laws as laws of motion.

247 Though it be supposed the chief business of a natural philosopher to trace out causes from the effects, yet this is to be understood not of agents (Sect. 155) but of principles, that is, of component parts, in one sense, or of law or rules, in another. In strict truth, all agents are incorporeal, and as such are not properly of physical consideration. The astronomer, therefore, the mechanic, or the chemist, not as such, but by accident only, treat of real causes, agents, or efficients. Neither doth it seem, as is supposed by the greatest of mechanical philosophers, that the true way of proceeding in their science is, from known motions in nature to investigate the moving forces; forasmuch as force is neither corporeal nor belongs to any corporeal thing (Sect. 220), nor yet to be discovered by experiments or mathematical reasonings, which reach no farther than discernible effects, and motions in things passive and moved.

248 *Vis* or force is to the soul what extension is to the body, saith St. Augustine, in his tract *Concerning the Quantity of the Soul;*[2] and without force there is nothing done or made, and consequently there can be no agent. Authority is not to decide in this case. Let any one consult his own notions and reason, as well as experience, concerning the origin of motion, and the respective natures, properties, and differences of soul and body, and he will, if I mistake not, evidently perceive that there is nothing active in the latter. Nor are they natural agents or corporeal forces which make the particles of bodies to cohere. Nor is it the business of experimental philosophers to find them out.

[1] [*Optics*, BK. III, PT. i, qu. 31.—Ed.] [2] [*De quantitate animae*, ch. 17. xxx (Migne, *Patrologia Latina*, VOL. I, p. 1052*b*).—Ed.]

249 The mechanical philosopher, as hath been already observed, inquires properly concerning the rules and modes of operation alone, and not concerning the cause; forasmuch as nothing mechanical is or really can be a cause (Sects. 236, 247). And although a mechanical or mathematical philosopher may speak of absolute space, absolute motion, and of force as existing in bodies, causing such motion and proportional thereto; yet what these forces are which are supposed to be lodged in bodies, to be impressed on bodies, to be multiplied, divided, and communicated from one body to another, and which seem to animate bodies like abstract spirits or souls, hath been found very difficult, not to say impossible, for thinking men to conceive and explain; as may be seen by consulting Borellus *De Vi Percussionis*, and Torricelli in his *Lezioni Academiche*, among other authors.

250 Nor, if we consider the proclivity of mankind to realize their notions, will it seem strange that mechanic philosophers and geometricians should, like other men, be misled by prejudice, and take mathematical hypotheses for real beings existing in bodies, so far as even to make it the very aim and end of their science to compute or measure those phantoms; whereas it is very certain that nothing in truth can be measured [1] or computed beside the very effects or motions themselves. Sir Isaac Newton asks,[2] Have not the minute particles of bodies certain forces or powers by which they act on one another, as well as on the particles of light, for producing most of the phenomena in nature? But, in reality, those minute particles are only agitated according to certain laws of nature, by some other agent, wherein the force exists and not in them, which have only the motion; which motion in the body moved the Peripatetics rightly judge to be a mere passion, but in the mover to be ἐνέργεια or act.

251 It passeth with many, I know not how, that mechanical principles give a clear solution of the phenomena. The Democritic hypothesis, saith Dr. Cudworth,[3] doth much more handsomely and intelligibly solve the phenomena than that of Aristotle and Plato. But, things rightly considered, perhaps it will be found not to solve any phenomenon at all; for all phenomena are, to speak truly, appearances in the soul or mind; and

[1] This subject is handled at large in my Latin tract *De motu*, published above twenty years ago. [2] [*Optics*, BK. III, PT. I, qu. 31.—Ed.] [3] [*True intellectual System* (1678), I, i, 45. In this section Berkeley re-affirms the doctrine of his *Principles* that the very being of sensory objects is relative to mind. —Ed.]

it hath never been explained, nor can it be explained, how external bodies, figures, and motions, should produce an appearance in the mind. Those principles, therefore, do not solve, if by solving is meant assigning the real, either efficient or final, cause of appearances, but only reduce them to general rules.

252 There is a certain analogy, constancy, and uniformity in the phenomena or appearances of nature, which are a foundation for general rules: and these are a grammar[1] for the understanding of nature, or that series of effects in the visible world whereby we are enabled to foresee what will come to pass in the natural course of things. Plotinus observes, in his third *Ennead*,[2] that the art of presaging is in some sort the reading of natural letters denoting order, and that so far forth as analogy obtains in the universe, there may be vaticination. And in reality, he that foretells the motions of the planets, or the effects of medicines, or the result of chemical or mechanical experiments, may be said to do it by natural vaticination.

253 We know a thing when we understand it; and we understand it when we can interpret or tell what it signifies. Strictly, the sense knows nothing.[3] We perceive indeed sounds by hearing, and characters[4] by sight; but we are not therefore said to understand them. After the same manner, the phenomena of nature are alike visible to all; but all have not alike learned the connexion of natural things, or understand what they signify, or know how to vaticinate by them. There is no question, saith Socrates *in Theæteto*, concerning that which is agreeable to each person, but concerning what will in time to come be agreeable, of which all men are not equally judges. He who foreknoweth what will be in every kind is the wisest. According to Socrates,[5] you and the cook may judge of a dish on the table equally well, but while the dish is making, the cook can better foretell what will ensue from this or that manner of composing it. Nor is this manner of reasoning confined only to morals or politics, but extends also to natural science.

254 As the natural connexion of signs with the things signified is regular and constant, it forms a sort of rational discourse (Sect. 152), and is therefore the immediate effect of an intelligent cause.

l 16 *result*—(*A, E*) *results.*

[1] [A grammar because the rules have exceptions (*Principles*, Sect. 108), and because concerned with God's language to us.—Ed.] [2] [III, iii, 6.—Ed.] [3] [See my Introduction, above, p. 15.—Ed.] [4] [Commonly used for 'letters.'—Ed.] [5] [Plato, *Theaetetus*, 178 D.—Ed.]

This is agreeable to the philosophy of Plato, and other ancients. Plotinus indeed saith,[1] that which acts naturally is not intellection, but a certain power of moving matter, which doth not know but only do. And it must be owned that, as faculties are multiplied by philosophers according to their operations, the will may be distinguished from the intellect.[2] But it will not therefore follow that the Will which operates in the course of nature is not conducted and applied by intellect, although it be granted that neither will understands, nor intellect wills. Therefore, the phenomena of nature, which strike on the senses and are understood by the mind, form not only a magnificent spectacle, but also a most coherent, entertaining, and instructive Discourse; and to effect this, they are conducted, adjusted, and ranged by the greatest wisdom. This Language[3] or Discourse is studied with different attention, and interpreted with different degrees of skill. But so far as men have studied and remarked its rules, and can interpret right, so far they may be said to be knowing in nature. A beast is like a man who hears a strange tongue but understands nothing.

255 Nature, saith the learned Doctor Cudworth,[4] is not master of art or wisdom: nature is *ratio mersa et confusa*, reason immersed and plunged into matter, and as it were fuddled in it and confounded with it. But the formation of plants and animals, the motions of natural bodies, their various properties, appearances, and vicissitudes, in a word, the whole series of things in this visible world, which we call the Course of Nature, is so wisely managed and carried on that the most improved human reason cannot thoroughly comprehend even the least particle thereof; so far is it from seeming to be produced by fuddled or confounded reason.

256 Natural productions, it is true, are not all equally perfect. But neither doth it suit with the order of things, the structure of the universe, or the ends of Providence, that they should be so. General rules, we have seen (Sects. 249, 252), are necessary to make the world intelligible; and

[1] [II. iii, 17.—Ed.] [2] [That the distinction is a forced one had been urged by Berkeley in his *Principles*, Sect. 27.—Ed.] [3] [On Nature as a visual language with which God communicates with us see *Essay on Vision*, Sect. 147; *Principles*, Sects. 44, 66 (1st edn.) and 108 (1st edn.); and *Alciphron*, IV, 12. Cudworth (*Eternal and Immutable Morality* (1731), ch. iii, Sect. 13) had written of 'Nature's language,' but as the connexion rather of physical stimulus with sensation than of sensations with one another.—Ed.] [4] [*True intellectual System*, BK. I, iii, 37, 12 (1845 edn., VOL. I, p. 239).—Ed.]

from the constant observation of such rules, natural evils will sometimes unavoidably ensue; things will be produced in a slow length of time, and arrive at different degrees of perfection.[1]

257 It must be owned, we are not conscious of the systole and diastole of the heart, or the motion of the diaphragm. It may not nevertheless be thence inferred that unknowing nature can act regularly, as well as ourselves. The true inference is that the self-thinking individual, or human person, is not the real author of those natural motions. And, in fact, no man blames himself if they are wrong, or values himself if they are right. The same may be said of the fingers of a musician, which some object to be moved by habit which understands not; it being evident that what is done by rule must proceed from something that understands the rule; therefore, if not from the musician himself, from some other active intelligence, the same perhaps which governs bees and spiders, and moves the limbs of those who walk in their sleep.

258 Instruments, occasions, and signs (Sect. 160) occur in, or rather make up, the whole visible Course of Nature. These, being no agents themselves, are under the direction of one Agent concerting all for one end, the supreme good. All those motions, whether in animal bodies or in other parts of the system of nature, which are not effects of particular wills, seem to spring from the same general cause with the vegetation of plants—an æthereal spirit actuated by a Mind.

259 The first poets and theologers of Greece and the East considered the generation of things as ascribed rather to a divine cause, but the *physici* to natural causes, subordinate to and directed still by a divine; except some corporealists and mechanics, who vainly pretended to make a world without a God. The hidden force that unites, adjusts, and causeth all things to hang together and move in harmony—which Orpheus and Empedocles[2] styled Love—this principle of union is no blind principle, but acts with intellect. This divine Love and Intellect are not themselves obvious to our view, or otherwise discerned than in their effects. Intellect enlightens, Love connects, and the Sovereign Good attracts all things.

l 9 *self-thinking*—(*A*, *B*, *E*) *self*, *thinking*. *l* 19 *occur*—(*A*, *B*) *do occur*.

[1] [On the problem of natural evil see *Principles*, Sect. 151, and *Alciphron*, IV, 23 f.—Ed.] [2] [Frag. 17 (Diels, *Fragmente der Vorsokratiker*, 5th edn., VOL. I, p. 315).—Ed.]

260 All things are made for the supreme good, all things tend to that end: and we may be said to account for a thing when we shew that it is so best. In the *Phædon*,[1] Socrates declares it to be his opinion that he who supposed all things to have been disposed and ordered by a Mind (Sects. 154, 160) should not pretend to assign any other cause of them. He blames physiologers for attempting to account for phenomena, particularly for gravity and cohesion, by vortexes and æther, overlooking the τὸ ἀγαθὸν and τὸ δέον, the strongest bond and cement which holds together all the parts of the universe, and not discerning the cause itself from those things which only attend it.

261 As in the microcosm,[2] the constant regular tenor of the motions of the viscera and contained juices doth not hinder particular voluntary motions to be impressed by the mind on the animal spirit; even so, in the mundane system, the steady observance of certain laws of nature, in the grosser masses and more conspicuous motions, doth not hinder but a voluntary agent may sometimes communicate particular impressions to the fine æthereal medium, which in the world answers the animal spirit in man. Which two (if they are two), although invisible and inconceivably small, yet seem the real latent springs whereby all the parts of this visible world are moved—albeit they are not to be regarded as a true cause, but only an instrument of motion, and the instrument not as a help to the Creator, but only as a sign to the creature.

262 Plotinus supposeth that the soul of the universe is not the original cause or author of the species, but receives them from Intellect, the true principle of order and distinction, the source and giver of forms.[3] Others consider the vegetative soul only as some lower faculty of a higher soul which animates the fiery æthereal spirit (Sect. 178). As for the blots and defects which appear in the course of this world—which some have thought to proceed from a fatality or necessity in nature, and others from an evil principle—that same philosopher observes[4] that, it may be, the governing Reason produceth and ordaineth all those

[1] [Plato, *Phaedo*, 97 c. Cp. Berkeley's *Principles*, Sect. 107: 'It should seem to become philosophers [this term then included scientists] to employ their thoughts (contrary to what some hold) about the final causes of things.'—Ed.]
[2] [The human body (see note on Sect. 145).—Ed.] [3] [? II. iii, 17. Postulating as the ultimate 'the One,' Plotinus first derives a cosmic Intellect, and then a World-Soul (cp. below, Sect. 352).—Ed.] [4] [III. ii, 11.—Ed.]

things; and, not intending that all parts should be equally good, maketh some worse than others by design. As all parts in an animal are not eyes: and in a city, comedy, or picture, all ranks, characters, and colours are not equal or like; even so excesses, defects, and contrary qualities conspire to the beauty and harmony of the world.

263 It cannot be denied that, with respect to the universe of things, we in this mortal state are like men educated in Plato's cave,[1] looking on shadows with our backs turned to the light. But though our light be dim, and our situation bad, yet if the best use be made of both, perhaps something may be seen. Proclus, in his *Commentary on the Theology of Plato*,[2] observes there are two sorts of philosophers. The one placed Body first in the order of beings, and made the faculty of thinking depend thereupon, supposing that the principles of all things are corporeal; that Body most really or principally exists, and all other things in a secondary sense, and by virtue of that. Others, making all corporeal things to be dependent upon Soul or Mind, think this to exist in the first place and primary sense, and the being of bodies to be altogether derived from and presuppose that of the Mind.

264 Sense and experience acquaint us with the course and analogy of appearances or natural effects. Thought, reason, intellect introduce us into the knowledge of their causes. Sensible appearances, though of a flowing, unstable, and uncertain nature, yet having first occupied the mind, they do by an early prevention render the aftertask of thought more difficult; and, as they amuse the eyes and ears, and are more suited to vulgar uses and the mechanic arts of life, they easily obtain a preference, in the opinion of most men, to those superior principles, which are the later growth of the human mind arrived to maturity and perfection, but, not affecting the corporeal sense, are thought to be so far deficient in point of solidity and reality; sensible and real, to common apprehensions, being the same thing; although it be certain that the principles of science are neither objects of sense nor imagination, and that intellect and reason are alone the sure guides to truth.[3]

265 The successful curiosity of the present age, in arts and experiments and new systems, is apt to elate men, and make them

l 4 *like*—(*E*) *alike.*

[1] [*Republic*, BK. VII *ad init.* Cp. below, Sect. 368.—Ed.] [2] [*In Platonis theologiam*, I, 3.—Ed.] [3] [Cp. Sects. 253 and 303, and my Introduction, above, p. 15.—Ed.]

overlook the ancients. But, notwithstanding that the encouragement and purse of princes, and the united endeavours of great Societies in these later ages, have extended experimental and mechanical knowledge very far, yet it must be owned that the ancients too were not ignorant of many things (Sects. 166, 167, 168, 241, 242, etc.), as well in physics as metaphysics, which perhaps are more generally, though not first, known in these modern times.

266 The Pythagoreans and Platonists had a notion of the true system of the world. They allowed of mechanical principles, but actuated by soul or mind: they distinguished the primary qualities in bodies from the secondary, making the former to be physical causes, and they understood physical causes in a right sense:[1] they saw that a mind infinite in power, unextended, invisible, immortal, governed, connected, and contained all things: they saw there was no such thing as real absolute space: that mind, soul, or spirit truly and really exists: that bodies exist only in a secondary and dependent sense: that the soul is the place of forms: that the sensible qualities are to be regarded as acts only in the cause, and as passions in us: they accurately considered the differences of intellect, rational soul, and sensitive soul, with their distinct acts of intellection, reasoning, and sensation, points wherein the Cartesians and their followers, who consider sensation as a mode of thinking, seem to have failed. They knew there was a subtle æther pervading the whole mass of corporeal beings, and which was itself actually moved and directed by a mind; and that physical causes were only instruments, or rather marks and signs.

267 Those ancient philosophers understood the generation of animals to consist in the unfolding and distending of the minute imperceptible parts of pre-existing animalcules, which passeth for a modern discovery:[2] this they took for the work of nature, but nature animate and intelligent (Sect. 172): they understood that all things were alive and in motion: they supposed a concord and discord, union and disunion, in particles, some attracting, others repelling each other: and that those attractions and repulsions so various, regular, and useful, could not be accounted for but by an intelligence presiding and directing all particular motions, for the conservation and benefit of the whole.

[1] [*I.e.* not agents but regular concomitants or signs: see Sects. 154, 231, 237, 251, etc.; cp. *Principles*, Sects. 25, 51 f., 65 f.—Ed.] [2] [See Sects. 282 and 233. —Ed.]

268 The Egyptians, who impersonated nature, had made her a distinct principle, and even deified her under the name of Isis. But Osiris was understood to be Mind or Reason, chief and sovereign of all. Osiris, if we may believe Plutarch,[1] was the first, pure, unmixed, and holy principle, not discernible by the lower faculties; a glimpse whereof, like lightning darting forth, irradiates the understanding: with regard to which Plutarch adds that Plato and Aristotle termed one part of philosophy ἐποπτικόν, to wit, when, having soared above common mixed objects and got beyond the precincts of sense and opinion, they arrive to contemplate the first and most simple Being free from all matter and composition. This is that οὐσία ὄντως οὖσα of Plato[2] which employeth mind alone; which alone governs the world. And the soul is that which immediately informs and animates nature.

269 Although the Egyptians did symbolically represent the supreme Divinity sitting on a lotus, and that gesture has been interpreted to signify the most holy and venerable Being to be utterly at rest reposing within himself; yet, for anything that appears, this gesture might denote dignity as well as repose. And it cannot be denied that Jamblichus,[3] so knowing in the Egyptian notions, taught there was an Intellect that proceeded to generation, drawing forth the latent powers into light in the formation of things. Nor was this to be understood of an external world, subsisting in real absolute space; for it was a doctrine of those ancient sages that Soul was the place of forms, as may be seen in the twelfth book of the *Arcane Part of Divine Wisdom, according to the Egyptians.*[4] This notion was embraced by divers philosophers of Greece, who may be supposed to have derived it from the same source from whence many of their other opinions were drawn.

270 The doctrine of real, absolute, external space induced some modern philosophers to conclude it was a part or attribute of God, or that God himself was space; inasmuch as incommunicable attributes of the Deity appeared to agree thereto, such as infinity, immutability, indivisibility, incorporeity, being uncreated,

l 13 *world—(A, B, E) soul.*

[1] [*De Iside et Osiride*, c. 78.—Ed.]. [2] [*Phaedrus*, 247 C and E.—Ed.] [3] [*De mysteriis*, VIII, 3. Traditionally attributed to the Syrian Neoplatonist Iamblichus (died *c.* A.D. 330).—Ed.] [4] [*De secretiore parte divinae sapientiae secundum Aegyptios*, XII, 3. This Neoplatonizing work, at one time attributed to Aristotle, is referred to again in Sects. 321 and 359.—Ed.]

impassive, without beginning or ending—not considering that all these negative properties may belong to nothing.[1] For, nothing hath no limits, cannot be moved, or changed, or divided, is neither created nor destroyed. A different way of thinking appears in the Hermaic as well as other writings of the ancients. With regard to absolute space, it is observed in the *Asclepian Dialogue*[2] that the word *space* or *place* hath by itself no meaning; and again, that it is impossible to understand what space alone or pure space is. And Plotinus acknowledgeth no place but soul or mind, expressly affirming that the soul is not in the world, but the world in the soul. And farther, the place of the soul, saith he, is not body, but soul is in mind, and body in soul. See the third chapter of the fifth book of the fifth *Ennead*.[3]

271 Concerning absolute space, that phantom of the mechanic and geometrical philosophers (Sect. 250), it may suffice to observe that it is neither perceived by any sense, nor proved by any reason,[4] and was accordingly treated by the greatest of the ancients as a thing merely visionary. From the notion of absolute space springs that of absolute motion;[5] and in these are ultimately founded the notions of external existence, independence, necessity, and fate. Which fate, the idol of many moderns, was by old philosophers differently understood, and in such a sense as not to destroy the αὐτεξούσιον[6] of God or man. Parmenides,

[1] [Berkeley is not here dismissing the old negative theology (cp. note on Sect. 352) but simply exposing the fallacy of an undistributed middle term in the argument: 'The divine nature is expressed in negative predicates: space is expressed in negative predicates: *therefore* space is an aspect of the divine nature.'—Ed.] [2] [III, 34a (*Hermetica*, ed. Scott, VOL. I, p. 320): 'nec per se quid sit locus apparet.' See note on Sect. 177.—Ed.] [3] [Not the third, but the ninth chapter, from which Berkeley is almost quoting.—Ed.] [4] [Berkeley's arguments against an absolute space are in *Principles*, Sects. 116 f. and *De motu*, Sects. 53 ff. On space as an alleged attribute of God see note on *Principles*, Sect. 117 (above, VOL. II, p. 94).—Ed.] [5] [Our judgment in these matters is not to be overborne by a presumed evidence of mathematical notions and reasonings, since it is plain the mathematicians of this age embrace obscure notions and uncertain opinions, and are puzzled about them, contradicting each other and disputing like other men: witness their doctrine of fluxions, about which, within these ten years, I have seen published about [*A*, *E*—'*above*'] twenty tracts and dissertations, whose authors being utterly at variance, and inconsistent with each other, instruct bystanders what to think of their pretensions to evidence. [Berkeley had criticized Newton's doctrine of fluxions in his *Analyst* (1734); cp. *Principles*, Sect. 132, text of 1st edn.—Ed.] [6] ['Free or independent power,' or 'free will' ('liberam arbitrii potestatem, quod αὐτεξούσιον dicitur,' Tertullian, (*De anima*, 21).—Ed.]

who thought all things to be made by necessity or fate, understood justice and Providence to be the same with fate; which, how fixed and cogent soever with respect to man, may yet be voluntary with respect to God. Empedocles declared fate to be a cause using principles and elements. Heraclitus taught that fate was the general reason that runs through the whole nature of the universe; which nature he supposed to be an ethereal body, the seed of the generation of all things. Plato held fate to be the eternal reason or law of nature. Chrysippus supposed that fate was a spiritual power which disposed the world in order; that it was the reason and law of those things which are administered by Providence.

272 All the foregoing notions of fate, as represented by Plutarch,[1] plainly shew that those ancient philosophers did not mean by fate a blind, headlong, unintelligent principle, but an orderly settled course of things, conducted by a wise and provident Mind. And as for the Egyptian doctrine, it is indeed asserted in the *Pimander*[2] that all things are produced by fate. But Jamblichus, who drew his notions from Egypt, affirms[3] that the whole of things is not bound up in fate, but that there is a principle of the soul higher than nature, whereby we may be raised to a union with the gods, and exempt ourselves from fate. And in the *Asclepian Dialogue*[4] it is expressly said that fate follows the decrees of God. And indeed, as all the motions in nature are evidently the product of reason (Sect. 154), it should seem there is no room for necessity in any other sense than that of a steady regular course.

273 Blind fate and blind chance are at bottom much the same thing, and one no more intelligible than the other. Such is the mutual relation, connexion, motion, and sympathy of the parts of this world, that they seem as it were animated and held together by one Soul: and such is their harmony, order, and

l 15 *plainly*—(*A*, *B*, *E*) *do plainly.*

[1] [ps.-Plut., *De plac philos.*, I, 25–8.—Ed.] [2] [*Asclepian Dialogue*, III, 39 (*Hermetica*, ed. Scott, VOL. I, p. 362). Berkeley writes 'Pimander' because from Marsiglio Ficino onwards this title of the first of the Hermetic writings was used of the whole collection.—Ed.] [3] [*De mysteriis*, V, 18.—Ed.] [4] [III, 39. So also *Poimandres*, XII, I. ix.—Ed.]

regular course, as sheweth the Soul to be governed and directed by a Mind. It was an opinion of remote antiquity that the world was an animal (Sects. 153, 172). If we may trust the Hermaic writings, the Egyptians thought all things did partake of life.[1] This opinion was also so general and current among the Greeks that Plutarch asserts[2] all others held the world to be an animal, and governed by Providence, except Leucippus, Democritus, and Epicurus. And although an animal containing all bodies within itself could not be touched or sensibly affected from without, yet it is plain they attributed to it an inward sense and feeling, as well as appetites and aversions; and that from all the various tones, actions, and passions of the universe, they supposed one symphony, one animal act and life to result.

274 Jamblichus declares[3] the world to be one animal, in which the parts, however distant each from other, are nevertheless related and connected by one common nature. And he teacheth, what is also a received notion of the Pythagoreans and Platonics, that there is no chasm in nature, but a Chain or Scale of beings rising by gentle uninterrupted gradations from the lowest to the highest, each nature being informed and perfected by the participation of a higher. As air becomes igneous, so the purest fire becomes animal, and the animal soul becomes intellectual: which is to be understood not of the change of one nature into another, but of the connexion of different natures, each lower nature being, according to those philosophers, as it were a receptable or subject for the next above it to reside and act in.

275 It is also the doctrine of the Platonic philosophers that Intellect is the very life of living things, the first principle and exemplar of all, from whence by different degrees are derived the inferior classes of life: first the rational, then the sensitive, after that the vegetal; but so as in the rational animal there is still somewhat intellectual,[4] again in the sensitive there is somewhat rational, and in the vegetal somewhat sensitive, and lastly, in mixed bodies, as metals and minerals, somewhat of vegetation.

l 16 *each from—(E) from each.*

[1] [*Poimandres*, XII, 18 (Scott, VOL. I, p. 234).—Ed.] [2] [ps.-Plut., *De plac. philos.*, II, 3.—Ed.] [3] [*De mysteriis*, IV, 12.—Ed.] [4] [In the old terminology, intellect (*νοῦς*) and reason (*διάνοια*) are distinguished respectively as intuitive and discursive (*i.e.* passing from premises to conclusion). Cp. Sect. 303. —Ed.]

By which means the whole is thought to be more perfectly connected. Which doctrine implies that all the faculties, instincts, and motions of inferior beings, in their several respective subordinations, are derived from and depend upon Mind and Intellect.

276 Both Stoics and Platonics held the world to be alive, though sometimes it be mentioned as a sentient animal,[1] sometimes as a plant or vegetable. But in this, notwithstanding what hath been surmised by some learned men, there seems to be no atheism.[2] For, so long as the world is supposed to be quickened by elementary fire[3] or spirit, which is itself animated by soul and directed by understanding, it follows that all parts thereof originally depend upon, and may be reduced unto, the same indivisible stem or principle, to wit, a Supreme Mind—which is the concurrent doctrine of Pythagoreans, Platonics, and Stoics.

277 There is, according to those philosophers, a life infused throughout all things: the πῦρ νοερόν, πῦρ τεχνικόν, an intellectual and artificial fire (Sects. 166, 168, 174, 175, etc.), an inward principle, animal spirit, or natural life, producing and forming within as art doth without, regulating, moderating, and reconciling the various motions, qualities, and parts of this mundane system. By virtue of this life the great masses are held together in their orderly courses, as well as the minutest particles governed in their natural motions, according to the several laws of attraction, gravity, electricity, magnetism, and the rest. It is this gives instincts, teaches the spider her web, and the bee her honey. This it is that directs the roots of plants to draw forth juices from the earth, and the leaves and cortical vessels to separate and attract such particles of air, and elementary fire, as suit their respective natures.

278 Nature seems to be not otherwise distinguished from the *anima mundi* than as life is from soul, and, upon the principles of the oldest philosophers, may not improperly or incongruously be styled the life of the world. Some Platonics, indeed, regard life

[1] [See note on Sect. 153.—Ed.] [2] [In his examination of the great ancients, this acquittal becomes a refrain, recurring in Sects. 279, 287, 288, 300, 326, 352 and 354.—Ed.] [3] [Not the fire of the four elements, but the Aether of Sects. 152 ff., which sections are summarized in Sect. 277. As for 'soul,' this was used in Berkeley's day for *anima* (ψυχή), that which animates. On 'First Intellect' (Sect. 278), see note on Sect. 262.—Ed.]

as the act of nature, in like manner as intellection is of the mind or intellect. As the First Intellect acts by understanding, so nature according to them acts or generates by living. But life is the act of the soul, and seems to be very nature itself, which is not the principle but the result of another and higher principle, being a life resulting from soul, as cogitation from intellect.

279 If nature be the life of the world, animated by one Soul, compacted into one frame, and directed or governed in all parts by one Mind, this system cannot be accused of atheism though perhaps it may of mistake or impropriety. And yet, as one presiding mind gives unity to the infinite aggregate of things, by a mutual communion of actions and passions, and an adjustment of parts, causing all to concur in one view to one and the same end—the ultimate and supreme good of the whole—it should seem reasonable to say, with Ocellus Lucanus the Pythagorean,[1] that as life holds together the bodies of animals, the cause whereof is the soul, and as a city is held together by concord, the cause whereof is law, even so the world is held together by harmony, the cause whereof is God. And in this sense the world or universe may be considered either as one animal (Sects. 172, 277) or one city.

280 Aristotle[2] disapproves the opinion of those who hold a soul to be diffused throughout the world; and for this reason, because the elements are not alive. Though perhaps it may not be easy to prove that blood and animal spirit are more alive in man, than water and fire in the world. That philosopher, in his books *Of the Soul*,[3] remarks upon an opinion set forth in the Orphics, of the soul's entering from the universe into living creatures, being borne by winds, that this cannot be true of plants, or of certain animals which do not breathe. But air-vessels are by later experiments allowed to be found in all plants and animals.[4] And air may in some sort not improperly be said to be the carrier or vehicle of the soul, inasmuch as it is the vehicle of fire, which is the spirit immediately moved and animated by the soul (Sects. 163, 171).

l 8 *be*—(*E*) *be supposed.*

[1] [Of the fifth century B.C. The writings attributed to him (text in, e.g. Mullach, *Fragmenta philosophorum Graecorum*, 1860, VOL. I) are now referred to a later period. Berkeley's reference is to a fragment of *De legibus* quoted by Stobaeus, *Ecl. phys.*, I, 13.—Ed.] [2] [*De anima*, I, 5 (411^a, 7).—Ed.] [3] [*Ibid.*, 410^b, 27.—Ed.] [4] [See Sects. 29 and 33.—Ed.]

281 The living fire, the living, omniform seminary of the world, and other expressions of the like nature, occurring in the ancient and Platonic philosophy, how can they be understood exclusive of light or elemental fire?—the particles of which are known to be heterogeneous, and, for aught we know, may some of them be organised, and, notwithstanding their wonderful minuteness, contain original seeds which, being formed and sown in a proper matrix, do gradually unfold and manifest themselves, still growing to a just proportion of the species.

282 May not this æthereal seminary, consistently with the notions of that philosophy which ascribed much of generation to celestial influence, be supposed to impregnate plants and animals with the first principles, the stamina, or those animalcules which Plato, in his *Timæus*,[1] saith are invisible for their smallness, but, being sown in a proper matrix, are therein gradually distended and explicated by nourishment, and at length the animals brought forth to light? Which notion hath been revived and received of late years by many who perhaps are not aware of its antiquity, or that it was to be found in Plato. Timæus Locrensis, in his book *Of the Soul of the World*,[2] supposeth even souls to be derived from the celestial luminaries, excepting only the rational or intellectual part. But what influence or influx is there from the celestial bodies which hath not light for its vehicle (Sect. 43)?

283 What other nature there should be, intermediate between the Soul of the world (Sect. 171) and this gross corporeal system, which might be the vehicle of life, or, to use the language of philosophers, might receive or be impressed with the forms of things, is difficult to comprehend. It is a vulgar remark, that the works of art do not bear a nice microscopical inspection, but the more helps are used, and the more nicely you pry into natural productions, the more do you discover of the fine mechanism of nature, which is endless or inexhaustible; new and other parts, more subtle and delicate than the precedent, still continuing to offer themselves to view. And these microscopical

l 11 *ascribed*—(*E*) *ascribe.*

[1] [*Timaeus*, 91 D. In the next sentence Berkeley is referring to the microscopists, especially Leeuwenhoek (1632–1723), who held that reproduction is effected chiefly by animalcules in the seed of the male.—Ed.] [2] [*De anima mundi*, 7 (Mullach, *Frag. philos. Graec.*, 1860, VOL. II, p. 42*b*). This Timaeus was a Pythagorean of the fourth century B.C. The essay traditionally attributed to him is perhaps as late as the first century of our era.—Ed.]

observations have confirmed the ancient theory concerning generation, delivered in the *Timæus* of Plato. But that theory or hypothesis, how agreeable soever to modern discoveries, is not alone sufficient to explain the phenomena, without the immediate action of a mind. And Ficinus, notwithstanding what himself and other Platonics say of a plastic nature, is obliged to own that with the mundane force or Soul it is to be understood there is joined an Intelligence, upon which the seminal nature constantly depends, and by which it is governed.

284 Alcinous,[1] in his tract *Of the Doctrine of Plato*, saith that God hath given the world both mind and soul: others include both in the word *soul*, and suppose the Soul of the world to be God. Philo appears to be of this opinion in several parts of his writings. And Virgil, who was no stranger to the Pythagorean and Platonic tenets, writes to the same purpose:

> Deum namque ire per omnes
> Terrasque tractusque maris cœlumque profundum.
> Hinc pecudes, armenta, viros, genus omne ferarum,
> Quemque sibi tenues nascentem arcessere vitas.[2]

Thus much the schools of Plato and Pythagoras seem agreed in, to wit, that the Soul of the World (Sects. 153, 172), whether having a distinct mind of its own, or directed by a superior mind (Sects. 154, 279), doth embrace all its parts, connect them by an invisible and indissoluble chain, and preserve them ever well adjusted and in good order.

285 Naturalists, whose proper province it is to consider phenomena, experiments, mechanical organs and motions, principally regard the visible frame of things or corporeal world, supposing soul to be contained in body. And this hypothesis may be tolerated in physics, as it is not necessary in the arts of dialling or navigation to mention the true system or earth's motion. But those who, not content with sensible appearances, would penetrate into the real and true causes (the object of theology, metaphysics, or the *philosophia prima*), will rectify this error, and speak of the world as contained by the soul, and not the soul by the world.

286 Aristotle hath observed there were indeed some who thought so grossly as to suppose the universe to be one only

l 5 *himself*—(*E*) *he himself.*

[1] [A writer of uncertain date, apparently of the period of syncretism. His unreliable *Epitome* of Plato's philosophy was translated into English in Stanley's *History of Philosophy* (1656).—Ed.] [2] [*Georgics*, IV, 221–4.—Ed.]

corporeal and extended nature: but in the first book of his *Metaphysics*[1] he justly remarks they were guilty of a great mistake; forasmuch as they took into their account the elements of corporeal beings alone, whereas there are incorporeal beings also in the universe; and while they attempted to assign the causes of generation and corruption, and account for the nature of all things, they did at the same time destroy the very cause of motion.

287 It is a doctrine among other speculations contained in the Hermaic writings that all things are One. And it is not improbable that Orpheus, Parmenides, and others among the Greeks, might have derived their notion of τὸ ἕν, THE ONE, from Egypt. Though that subtle metaphysician Parmenides, in his doctrine of ἓν ἑστώς, seems to have added something of his own. If we suppose that one and the same Mind is the universal principle of order and harmony throughout the world, containing and connecting all its parts, and giving unity to the system, there seems to be nothing atheistical or impious in this supposition.

288 Number is no object of sense: it is an act of the mind.[2] The same thing in a different conception is one or many. Comprehending God and the creatures in one general notion, we may say that all things together make one universe, or τὸ πᾶν. But if we should say that all things make one God, this would, indeed, be an erroneous notion of God, but would not amount to atheism, so long as mind or intellect was admitted to be the τὸ ἡγεμονικόν, the governing part. It is, nevertheless, more respectful, and consequently the truer notion of God, to suppose Him neither made up of parts, nor to be Himself a part of any whole whatsoever.

289 All those who conceived the universe to be an animal must, in consequence of that notion, suppose all things to be one. But to conceive God to be the sentient soul of an animal is altogether unworthy and absurd. There is no sense nor sensory, nor anything like a sense or sensory, in God. Sense implies an impression from some other being, and denotes a dependence in the soul which hath it. Sense is a passion; and passions imply imperfection. God knoweth all things as pure mind or intellect; but nothing by sense, nor in nor through a sensory. Therefore to suppose a sensory of any kind—whether space or any other

l 11 THE ONE (*not in A, B*).

[1] [I, 3 (984*a*, 16 ff.).—Ed.] [2] [Cp. Sects. 347 and 355. A constant doctrine of Berkeley's (*Principles*, Sects. 12 and 120).—Ed.]

—in God, would be very wrong,[1] and lead us into false conceptions of His nature. The presuming there was such a thing as real, absolute, uncreated space seems to have occasioned that modern mistake. But this presumption was without grounds.[2]

290 Body is opposite to spirit or mind.[3] We have a notion of spirit from thought and action. We have a notion of body from resistance. So far forth as there is real power, there is spirit. So far forth as there is resistance, there is inability or want of power; that is, there is a negation of spirit. We are embodied, that is, we are clogged by weight, and hindered by resistance. But in respect of a perfect spirit, there is nothing hard or impenetrable: there is no resistance to the Deity: nor hath He any body: nor is the supreme Being united to the world as the soul of an animal is to its body, which necessarily implieth defect, both as an instrument, and as a constant weight and impediment.

291 Thus much it consists with piety to say, that a divine Agent doth by His virtue permeate and govern the elementary fire or light (Sects. 157, 172), which serves as an animal spirit to enliven and actuate the whole mass, and all the members of this visible world. Nor is this doctrine less philosophical than pious. We see all nature alive or in motion. We see water turned into air, and air rarefied and made elastic (Sects. 149, 152, 200) by the attraction of another medium, more pure indeed, more subtle, and more volatile, than air. But still, as this is a moveable, extended, and consequently a corporeal being (sect. 207), it cannot be itself the principle of motion, but leads us naturally and necessarily to an incorporeal spirit or agent. We are conscious that a spirit can begin, alter, or determine motion; but nothing of this appears in body. Nay, the contrary is evident, both to experiment and reflection.

292 Natural phenomena are only natural appearances. They are, therefore, such as we see and perceive them.[4] Their

l 18 *an animal*—(*A*, *E*) *animal.*

[1] [So also in *Three Dialogues*, III (above, VOL. II, pp. 240 f.); cp. *Essay on Vision*, Sect. 153. Newton had suggested, towards the close of his *Optics*, that space is God's sensorium, though he adds, 'we are not to consider the world as the body of God . . . He is a uniform being, void of organs, members, or parts' (III. 1).—Ed.] [2] [See note on Sect. 271.—Ed.]. [3] [One of Berkeley's basic doctrines: see *e.g. Principles*, Sect. 142, and *De motu*, Sects. 21 and 30.—Ed.] [4] [*i.e.* '*esse* is *percipi*' (*Principles*, Sects. 3–6). The term 'objective' here, as in Descartes, is used in the Scholastic sense of what is in the object as object, as present to our awareness, *i.e.* 'apparent' in the literal sense.—Ed.]

real and objective natures are, therefore, the same—passive without anything active, fluent and changing without anything permanent in them. However, as these make the first impressions, and the mind takes her first flight and spring, as it were, by resting her foot on these objects, they are not only first considered by all men, but most considered by most men. They and the phantoms that result from those appearances, the children of imagination grafted upon sense—such for example as pure space (Sect. 270)—are thought by many the very first in existence and stability, and to embrace and comprehend all other beings.

293 Now, although such phantoms as corporeal forces, absolute motions, and real spaces do pass in physics for causes and principles (Sects. 220, 249, 250), yet are they in truth but hypotheses, nor can they be the objects of real science.[1] They pass nevertheless in physics, conversant about things of sense, and confined to experiments and mechanics. But when we enter the province of the *philosophia prima*, we discover another order of beings, mind and its acts, permanent being, not dependent on corporeal things, nor resulting, nor connected, nor contained; but containing, connecting, enlivening the whole frame, and imparting those motions, forms, qualities, and that order and symmetry, to all those transient phenomena which we term the Course of Nature.

294 It is with our faculties as with our affections: what first seizes holds fast (Sect. 264). It is a vulgar theme, that man is a compound of contrarieties, which breed a restless struggle in his nature between flesh and spirit, the beast and the angel, earth and heaven, ever weighed down and ever bearing up. During which conflict the character fluctuates: when either side prevails, it is then fixed for vice or virtue. And life from different principles takes a different issue. It is the same in regard to our faculties. Sense at first besets and overbears the mind. The sensible appearances are all in all: our reasonings are employed about them; our desires terminate in them; we look no farther for realities or causes; till intellect begins to dawn, and cast a

[1] [For the enlargement of this section see *Principles*, Sects. 103–117, and *De motu*, esp. Sects, 17, 28, 35, 41, 66, and 71 f. Cp. Bacon: 'No perfect discovery can be made upon a flat or level; neither is it possible to discover the more remote and deeper parts of any science if you stand but upon the level of the same science and ascend not to a higher science' (*Advancement of Learning*, 1605, BK. I).—Ed.]

ray on this shadowy scene. We then perceive the true principle of unity, identity, and existence. Those things that before seemed to constitute the whole of being, upon taking an intellectual view of things, prove to be but fleeting phantoms.

295 From the outward form of gross masses which occupy the vulgar, a curious inquirer proceeds to examine the inward structure and minute parts, and, from observing the motions in nature, to discover the laws of those motions. By the way, he frames his hypothesis and suits his language to this natural philosophy. And these fit the occasion and answer the end of a maker of experiments or mechanic, who means only to apply the powers of nature, and reduce the phenomena to rules. But if, proceeding still in his analysis and inquiry, he ascends from the sensible into the intellectual world, and beholds things in a new light and a new order, he will then change his system, and perceive that what he took for substances and causes are but fleeting shadows; that the mind contains all, and acts all, and is to all created beings the source of unity and identity, harmony and order, existence and stability.

296 It is neither acid, nor salt, nor sulphur, nor air, nor æther, nor visible corporeal fire (Sect. 155), much less the phantom fate or necessity, that is the real agent, but, by a certain analysis, a regular connexion and climax, we ascend through all those mediums to a glimpse of the First Mover, invisible, incorporeal, unextended, intellectual source of life and being. There is, it must be owned, a mixture of obscurity and prejudice in human speech and reasonings. This is unavoidable, since the veils of prejudice and error are slowly and singly taken off one by one. But, if there are many links in the chain which connects the two extremes of what is grossly sensible and purely intelligible, and it seem a tedious work, by the slow helps of memory, imagination, and reason—oppressed and overwhelmed, as we are, by the senses, through erroneous principles, and long ambages of words and notions—to struggle upwards into the light of truth, yet, as this gradually dawns, further discoveries still correct the style and clear up the notions.

297 The mind, her acts and faculties, furnish a new and distinct class of objects[1] (Sects. 163, 266), from the contemplation whereof arise certain other notions, principles, and verities, so

l 25 *unextended (not in C).* *l* 25 *intellectual (not in B).*

[1] [See *Principles*, Sects. 89 and 142; and below, Sect. 308.—Ed.]

remote from, and even so repugnant to, the first prejudices which surprise the sense of mankind that they may well be excluded from vulgar speech and books, as abstract from sensible matters, and more fit for the speculation of truth, the labour and aim of a few, than for the practice of the world, or the subjects of experimental or mechanical inquiry.[1] Nevertheless, though, perhaps, it may not be relished by some modern readers, yet the treating in physical books concerning metaphysical and divine matters can be justified by great authorities among the ancients: not to mention that he who professedly delivers the elements of a science is more obliged to method and system, and tied down to more rigorous laws, than a mere essay-writer. It may, therefore, be pardoned if this rude essay doth, by insensible transitions, draw the reader into remote inquiries and speculations, that were not thought of either by him or by the author at first setting out.

298 There are traces of profound thought as well as primeval tradition in the Platonic, Pythagorean, Egyptian, and Chaldaic philosophy (Sects. 179, 266). Men in those early days were not overlaid with languages and literature. Their minds seem to have been more exercised, and less burdened, than in later ages; and, as so much nearer the beginning of the world, to have had the advantage of patriarchal lights handed down through a few hands. It cannot be affirmed indeed (how probable soever it may seem) that Moses was that same Mochus, with whose successors, priests and prophets, Pythagoras is said to have conversed at Sidon.[2] Yet the study of philosophy appears to be of very great antiquity and remote original; inasmuch as Timæus Locrensis, that ancient Pythagorean, author of the book *Concerning the Soul of the World*, speaks of a most ancient philosophy, even in his time, ἁ πρεσβύστα φιλοσοφία,[3] stirring up and recovering the soul from a state of ignorance to the contemplation of divine things. And

l 15 *not*—(*E errata*) *not perhaps*. *l* 24 *be affirmed indeed*—(*A*, *E*) *indeed be affirmed*.

[1] [Fraser surely errs in his note: 'Former hostility to abstraction seems abated here.' Berkeley is saying nothing about alleged abstractions from sense: he simply means that purely mental objects seem tenuous to minds used to dwelling on sensory matters. Cp. Sect. 323.—Ed.] [2] [As reported by Strabo (XVI, 2, xxiv, p. 757), who says that Mochus (Moschus in some texts) lived before the Trojan war—which enabled some later writers to identify him with Moses (cp. Cudworth, *True intellectual System*, 1678, BK. I, I, x; 1845 edn. VOL. I, p. 20; also his *Treatise concerning eternal and immutable Morality*, 1731, ch. 4). —Ed.] [3] [*De anima mundi*, 11 (Mullach, *Frag. philos. Graec.*, VOL. II, p. 46ᵃ). On Timaeus see note on Section. 282.—Ed.]

though the books attributed to Mercurius Trismegistus[1] were none of them wrote by him, and are allowed to contain some manifest forgeries, yet it is also allowed that they contain tenets of the ancient Egyptian philosophy, though dressed, perhaps, in a more modern garb. To account for which, Jamblichus[2] observes that the books under his name contain indeed Mercurial opinions, though often expressed in the style of the Greek philosophers, as having been translated from the Egyptian tongue into Greek.

299 The difference of Isis from Osiris (Sect. 268) resembles that of the moon from the sun, of the female from the male, of *natura naturata* (as the Schoolmen speak) from *natura naturans*.[3] But Isis, though mostly taken for nature, yet (as the pagan divinities were very fluctating things) it sometimes signified τὸ πᾶν. And we find in Montfaucon[4] an Isis of the ordinary form with this inscription, Θεοῦ παντός. And in the *Mensa Isiaca*, which seems to exhibit a general system of the religion and superstition of the Egyptians, Isis on her throne possesseth the centre of the table. Which may seem to signify that the universe or τὸ πᾶν was the centre of the ancient secret religion of the Egyptians, their Isis or τὸ πᾶν comprehending both Osiris the author of nature and his work.

300 Plato and Aristotle considered God as abstracted or distinct from the natural world. But the Egyptians considered God and nature as making one whole, or all things together as making one universe. In doing which they did not exclude the intelligent mind, but considered it as containing all things. Therefore, whatever was wrong in their way of thinking, it doth not, nevertheless, imply or lead to atheism.

301 The human mind is so much clogged and borne downward by the strong and early impressions of sense (Sect. 264), that it is wonderful how the ancients should have made even such a progress, and seen so far into intellectual matters, without some glimmering of a divine tradition. Whoever considers a parcel of rude savages left to themselves, how they are sunk and swallowed up in sense and prejudice, and how unqualified by their natural force to emerge from this state, will be apt to think that the first spark of philosophy was derived from heaven, and

[1] [See note on Sect. 177.—Ed.] [2] [? *De mysteriis*, VIII, 4.—Ed.] [3] [In mediaeval Latin *natura* often meant 'sex,' and *naturare* 'to create.'—Ed.] [4] [Bernard de Montfaucon (1655–1741): *L'Antiquité expliquée et representée en figures* (1719), 10 vols.; 1724, suppl. in 5 vols.—Ed.]

that it was (as a heathen writer expresseth it) θεοπαράδοτος φιλοσοφία.[1]

302 The lapsed state of human kind is a thing to which the ancient philosophers were not strangers. The λύσις, the φυγή, the παλιγγενεσία,[2] shew that the Egyptians and Pythagoreans, the Platonists and Stoics, had all some notion of this doctrine, the outlines of which seem to have been sketched out in those tenets. Theology and philosophy gently unbind the ligaments that chain the soul down to the earth, and assist her flight towards the sovereign Good. There is an instinct or tendency of the mind upwards, which sheweth a natural endeavour to recover and raise ourselves from our present sensual and low condition into a state of light, order, and purity.

303 The perceptions of sense are gross; but even in the senses there is a difference. Though harmony and proportion are not objects of sense,[3] yet the eye and the ear are organs which offer to the mind such materials by means whereof she may apprehend both the one and the other. By experiments of sense we become acquainted with the lower faculties of the soul; and from them, whether by a gradual (Sect. 275) evolution or ascent, we arrive at the highest. Sense supplies images to memory. These become subjects for fancy to work upon. Reason considers and judges of the imaginations. And these acts of reason become new objects to the understanding. In this scale, each lower faculty is a step that leads to one above it. And the uppermost naturally leads to the Deity, which is rather the object of intellectual knowledge than even of the discursive faculty, not to mention the sensitive. There runs a chain throughout the whole system of beings. In this chain one link drags another. The meanest things are connected with the highest. The calamity therefore is neither strange nor much to be complained of, if a low sensual reader shall, from mere love of the animal life, find himself drawn on, surprised and betrayed into some curiosity concerning the intellectual.

304 There is, according to Plato, properly no knowledge, but only opinion, concerning things sensible and perishing (Sects. 263, 264); not because they are naturally abstruse and involved in

[1] [θεοπαρ. σοφία occurs in Damascius (*De principiis*, Sect. 311; ed. Ruelle, 1889, *pars altera*, p. 177). Marinus (*Vita Procli*, 26) says that Iamblichus referred the Chaldaic doctrines to τὰ θεοπαρ. λόγια.—Ed.] [2] ['Redemption' or 'release,' 'escape,' 'rebirth.'—Ed.] [3] [Berkeley argues this in *Alciphron*, III, 8 f.—Ed.]

darkness, but because their nature and existence is uncertain, ever fleeting and changing, or rather, because they do not in strict truth exist at all, being always generating or *in fieri*, that is, in a perpetual flux, without anything stable or permanent in them to constitute an object of real science. The Pythagoreans and Platonics distinguish between τὸ γενόμενον and το ὄν,[1] that which is ever generated and that which exists. Sensible things and corporeal forms are perpetually producing and perishing, appearing and disappearing, never resting in one state, but always in motion and change, and therefore, in effect, not one being but a succession of beings: while τὸ ὂν is understood to be somewhat of an abstract or spiritual nature, and the proper object of intellectual knowledge. Therefore, as there can be no knowledge of things flowing and unstable, the opinion of Protagoras and Theætetus that sense was science[2] is absurd. And indeed nothing is more evident than that the apparent sizes and shapes, for instance, of things are in a constant flux, ever differing as they are viewed at different distances, or with glasses more or less accurate. As for those absolute magnitudes and figures, which certain Cartesians and other moderns suppose to be in things, that must seem a vain supposition to whoever considers it is supported by no argument of reason, and no experiment of sense.[3]

305 As understanding perceiveth not, that is, doth not hear, or see, or feel, so sense knoweth not:[4] and although the mind may use both sense and fancy, as means whereby to arrive at knowledge, yet sense, or soul so far forth as sensitive, knoweth nothing. For, as it is rightly observed in the *Theætetus* of Plato, science consists not in the passive perceptions, but in the reasoning upon them—τῷ περὶ ἐκείνων συλλογισμῷ.[5]

306 In the ancient philosophy of Plato and Pythagoras, we find distinguished three sorts of objects. In the first place, a form or species that is neither generated nor destroyed, unchangeable, invisible, and altogether imperceptible to sense, being only understood by the intellect. A second sort there is, ever fluent and changing (Sects. 292, 293), generating and perishing, appearing and vanishing; this is comprehended by sense and opinion. The third kind is matter, which, as Plato teacheth, being neither an object of understanding nor of sense, is hardly

[1] [Plato, *Timaeus*, 27 D.—Ed.] [2] [Plato, *Theætetus*, 151 E.—Ed.] [3] [See first note on Sect. 270.—Ed.] [4] [See Sect. 253, and my Introduction, above, p. 15—Ed.] [5] [186 D.—Ed.]

to be made out by a certain spurious way of reasoning, λογισμῷ τινι νόθῳ μόγις πιστόν (see his *Timæus*).[1] The same doctrine is contained in the Pythagoric treatise *De Anima Mundi*,[2] which, distinguishing ideas, sensible things, and matter, maketh the first to be apprehended by intellect, the second by sense, and the last, to wit, matter, λογισμῷ νόθῳ. Whereof Themistius the Peripatetic assigns the reason. For, saith he,[3] that act is to be esteemed spurious whose object hath nothing positive, being only a mere privation, as silence or darkness. And such he accounteth matter.

307 Aristotle maketh a threefold distinction of objects, according to the three speculative sciences. Physics he supposeth to be conversant about such things as have a principle of motion in themselves; Mathematics about things permanent but not abstracted; and Theology about Being abstracted and immoveable; which distinction may be seen in the ninth book of his *Metaphysics*.[4] Where by abstracted, χωριστόν, he understands separable from corporeal beings and sensible qualities.

308 That philosopher held that the mind of man was a *tabula rasa*,[5] and that there were no innate ideas. Plato, on the contrary, held original ideas in the mind, that is, notions which never were or can be in the sense, such as being, beauty, goodness, likeness, parity. Some, perhaps, may think the truth to be this—that there are properly no ideas, or passive objects, in the mind but what were derived from sense: but that there are also besides these her own acts or operations; such are notions.[6]

309 It is a maxim of the Platonic philosophy that the soul of man was originally furnished with native inbred notions, and stands in need of sensible occasions, not absolutely for producing them, but only for awakening, rousing, or exciting into act what was already pre-existent, dormant, and latent in the soul;

[1] [52 B.—Ed.] [2] [Ch. 1 (in Mullach, *Frag. philos. Graec.*, VOL. II, p.38[a]). On this work see note on Sect. 282.—Ed.] [3] [*De anima*, Z, ch. 6, p. 205, 9 (*Commentaria in Aristotelem Graeca*, VOL. 5, PART III, p. 111).—Ed.] [4] [In our editions, BK. XI (ch. 7, 1064[b], 1).—Ed.] [5] [*De anima*, III, 4 (430[a], 1). The well-known Latin expression seems to come from St. Thomas, *Summa theol.*, I, qu. 79, art. 2 ('sicut tabula rasa in qua nihil est scriptum, ut Philosophus dicit in 3 "De anima"'). Plato's doctrine of innate ideas takes the form that all general knowledge is reminiscence (*Meno*, 81 ff.).—Ed.] [6] [This is Berkeley's own view. See my Introduction to the *Principles* (above, VOL. II, p. 13).—Ed.]

as things are said to be laid up in the memory, though not actually perceived until they happen to be called forth and brought into view by other objects. This notion seemeth somewhat different from that of innate ideas as understood by those moderns who have attempted to explode them.[1] To understand and to be are, according to Parmenides, the same thing.[2] And Plato in his seventh Letter[3] makes no difference between *νοῦς* and *ἐπιστήμη*, mind and knowledge. Whence it follows that mind, knowledge, and notions, either in habit or in act, always go together.

310 And albeit Aristotle considered the soul in its original state as a blank paper, yet he held it to be the proper place of forms, *τὴν ψυχὴν εἶναι τόπον εἰδῶν*[4] (Sect. 269). Which doctrine, first maintained by others, he admits, under this restriction, that it is not to be understood of the whole soul, but only of the *νοητικὴ*; as is to be seen in his third book *De Anima*. Whence, according to Themistius in his commentary on that treatise,[5] it may be inferred that all beings are in the soul. For, saith he, the forms are the beings. By the form everything is what it is. And he adds, it is the soul that imparteth forms to matter; *τὴν ὕλην μορφῶσα ποικίλαις μορφαῖς*. Therefore they are first in the soul. He further adds that the mind is all things; taking the forms of all things, it becomes all things by intellect and sense. Alexander Aphrodisæus saith as much, affirming the mind to be all things, *κατά τε τὸ νοεῖν καὶ τὸ αἰσθάνεσθαι*.[6] And this in fact is Aristotle's own doctrine, in his third book *De Anima*, where he also asserts, with Plato, that actual knowledge and the thing known are all one: *τὸ αὐτὸ δέ ἐστιν ἡ κατ' ἐνέργειαν ἐπιστήμη τῷ πράγματι*.[7] Whence it follows that the things are where the knowledge is, that is to say, in the mind. Or, as it is otherwise expressed, that the soul is all things. More might be said to explain Aristotle's notion, but it would lead too far.

311 As to an absolute actual existence (Sects. 264, 292, 294) of sensible or corporeal things, it doth not seem to have been admitted either by Plato or Aristotle. In the *Theætetus*[8] we are

[1] [Chiefly John Locke, *Essay conc. Human Understanding*, BK. I.—Ed.] [2] [Fr. 3 in Diels, *Fragmente der Vorsokratiker*, 5th edn., 1934, VOL. I, p. 231.—Ed.] [3] [342 C. —Ed.] [4] [*De anima*, III. 4 (429ª, 27).—Ed.] [5] [*De anima*, Z, ch. 8, p. 212, 21 (*Comment. in Arist. Graeca*, VOL. 5, PART III, p. 115).—Ed.] [6] [*In Metaphysica*, XI, 9, 689, 2 (*ibid.*, VOL. I, p. 713).—Ed.] [7] [Ch. 7 (431ª, 1).—Ed.] [8] [157 A, 160 B.—Ed.]

told that if any one saith a thing is, or is made, he must withal say, for what, or of what, or in respect of what, it is, or is made; for, that any thing should exist in itself or absolutely is absurd. Agreeably to which doctrine it is also farther affirmed by Plato that it is impossible a thing should be sweet and sweet to nobody. It must, nevertheless, be owned with regard to Aristotle, that even in his *Metaphysics* there are some expressions which seem to favour the absolute existence of corporeal things. For instance, in the eleventh book,[1] speaking of corporeal sensible things, 'What wonder,' saith he, 'if they never appear to us the same, no more than to sick men,' since we are always changing and never remain the same ourselves? And again, he saith, 'Sensible things, although they receive no change in themselves, do nevertheless in sick persons produce different sensations and not the same.' These passages would seem to imply a distinct and absolute existence of the objects of sense.

312 But it must be observed that Aristotle distinguisheth a twofold existence, potential and actual. It will not therefore follow that, according to Aristotle, because a thing is, it must actually exist. This is evident from the eighth book of his *Metaphysics*,[2] where he animadverts on the Megaric philosophers, as not admitting a possible existence distinct from the actual: from whence, saith he, it must follow, that 'there is nothing cold, or hot, or sweet, or any sensible thing at all, where there is no perception.' He adds that, in consequence of that Megaric doctrine, we can have no sense but while we actually exert it: we are blind when we do not see, and therefore 'both blind and deaf several times in a day.'

313 The ἐντελέχειαι πρῶται of the Peripatetics, that is, the sciences, arts, and habits, were by them distinguished from the acts or ἐντελέχειαι δεύτεραι, and supposed to exist in the mind, though not exerted or put into act. This seems to illustrate the manner in which Socrates, Plato, and their followers, conceived innate (Sect. 309) notions to be in the soul of man. It was the Platonic doctrine that human souls or minds descended from above, and were sowed in generation; that they were stunned, stupified, and intoxicated by this descent and immersion into animal nature; and that the soul, in this ὀνείρωξις or slumber, forgets her original notions, which are smothered and oppressed

l 34 *conceived*—(*E*) *conceive.*

[1] [Ch. 6 (1063^a, 36).—Ed.] [2] [BK. IX, 3 (1046^b, 29).—Ed.]

by many false tenets and prejudices of sense.[1] Insomuch that Proclus [2] compares the soul, in her descent invested with growing prejudices, to Glaucus diving to the bottom of the sea, and there contracting divers coats of seaweed, coral, and shells, which stick close to him, and conceal his true shape.

314 Hence, according to this philosophy, the mind of man is so restless to shake off that slumber, to disengage and emancipate herself from those prejudices and false opinions that so straitly beset and cling to her, to rub off those covers that disguise her original form, and to regain her primeval state and first notions : hence that perpetual struggle to recover the lost region of light, that ardent thirst and endeavour after truth and intellectual ideas, which she would neither seek to attain, nor rejoice in, nor know when attained, except she had some prenotion or anticipation of them, and they had lain innate and dormant, like habits and sciences in the mind, or things laid up, which are called out and roused by recollection or reminiscence. So that learning seemeth in effect reminiscence.[3]

315 The Peripatetics themselves distinguish between reminiscence and mere memory. Themistius observes [4] that the best memories commonly go with the worst parts ; but that reminiscence is most perfect in the most ingenious minds. And notwithstanding the *tabula rasa* of Aristotle (Sect. 308), yet some of his followers have undertaken to make him speak Plato's sense. Thus Plutarch the Peripatetic teacheth, as agreeable to his master's doctrine, that learning is reminiscence, and that the *νοῦς καθ' ἕξιν* is in children. Simplicius also, in his commentary on the third book of Aristotle *περὶ ψυχῆς*,[5] speaketh of a certain interior reason in the soul, acting of itself, and originally full of its own proper notions, *πλήρης ἀφ' ἑαυτοῦ τῶν οἰκείων γνωστῶν*.

316 And as the Platonic philosophy supposed intellectual notions to be originally inexistent or innate in the soul (Sects. 309, 314), so likewise it supposed sensible qualities to exist (though

l 20 *the best memories commonly*—(*A, B, C, E*) *commonly the best memories.*

[1] [*Timaeus*, 52 B.—Ed.] [2] [*Comment. in Alcib. Platonis Priorem* (ed. Fr. Creuzer, 1820, PART I, p. 224).—Ed.] [3] [So Plato, *Meno*, 86 A; *Phaedo*, 72 E.—Ed.] [4] [*In De memoria et reminiscentia*, 1. Plutarch the Peripatetic seems to be Plutarch the Athenian, a Neoplatonist of the fifth century A.D., whose commentary on Aristotle's *De anima* is lost. Scarcely anything is known of him (see *e.g* Suidas, *s.v.*).—Ed.] [5] [Ch. 4 (*Comment. in Arist. Graeca*, VOL. XI, p. 219, line 1).—Ed.]

not originally) in the soul, and there only. Socrates saith to Theætetus,[1] You must not think the white colour that you see is in any thing without your eyes, or in your eyes, or in any place at all. And in the *Timæus*,[2] Plato teacheth that the figure and motion of the particles of fire dividing the parts of our bodies produce that painful sensation we call heat. And Plotinus, in the sixth book of his second *Ennead*,[3] observes that heat and other qualities are not qualities in the things themselves, but acts; that heat is not a quality, but act, in the fire; that fire is not really what we perceive in the qualities light, heat, and colour. From all which it is plain that whatever real things they suppose to exist independent of the soul, those were neither sensible things nor clothed with sensible qualities.

317 Neither Plato nor Aristotle by matter, ὕλη, understood corporeal substance, whatever the moderns may understand by that word. To them certainly it signified no positive actual being. Aristotle describes it as made up of negatives,[4] having neither quantity, nor quality, nor essence. And not only the Platonists and Pythagoreans, but also the Peripatetics themselves declare it to be known neither by sense, nor by any direct and just reasoning, but only by some spurious or adulterine method, as hath been observed before.[5] Simon Portius, a famous Peripatetic of the sixteenth century, denies it to be any substance at all, for, saith he, *Nequit per se subsistere, quia sequeretur, id quod non est in actu esse in actu.*[6] If Jamblichus may be credited,[7] the Egyptians supposed matter so far from including aught of substance or essence that, according to them, God produced it by a separation from all substance, essence, or being, ἀπὸ οὐσιότητος ἀποχισθείσης ὑλότητος. That matter is actually nothing, but potentially all things, is the doctrine of Aristotle, Theophrastus, and all the ancient Peripatetics.

318 According to those philosophers, matter is only a *pura potentia*, a mere possibility. But Anaximander, successor to Thales, is represented as having thought the supreme Deity to be infinite matter. Nevertheless, though Plutarch calleth it matter,[8] yet it was simply τὸ ἄπειρον, which means no more than infinite or indefinite. And although the moderns teach that space is

[1] [Plato, *Theaetetus*, 153 D.—Ed.] [2] [61 E.—Ed.] [3] [Ch. 3.—Ed.] [4] [*Metaphysics*, VII, 3 (1029ª, 24).—Ed.] [5] [In Sect. 306.—Ed.] [6] [Porta (d. 1555), an immediate disciple of Pomponazzi. *De Humana Mente Disputatio* (1551, Florence), c. VII, p. 42.—Ed.] [7] [*De mysteriis*, VIII, 3.—Ed.] [8] [ps.-Plut., *De plac. philos.*, I, 3.—Ed.]

real and infinitely extended, yet, if we consider that it is no intellectual notion, nor yet perceived by any of our senses,[1] we shall perhaps be inclined to think with Plato in his *Timæus* [2] that this also is the result of λογισμὸς νόθος, or spurious reasoning, and a kind of waking dream. Plato observes that we dream, as it were, when we think of place, and believe it necessary that whatever exists should exist in some place. Which place or space (Sects. 250, 270), he also observes, is μετ' ἀναισθησίας ἁπτόν,[2] that is, to be felt as darkness is seen, or silence heard, being a mere privation.

319 If any one should think to infer the reality or actual being of matter from the modern tenet that gravity is always proportionable to the quantity of matter, let him but narrowly scan the modern demonstration of that tenet, and he will find it to be a vain circle,[3] concluding in truth no more than this—that gravity is proportionable to weight, that is, to itself. Since matter is conceived only as defect and mere possibility; and since God is absolute perfection and act; it follows there is the greatest distance and opposition imaginable between God and matter. Insomuch that a material God would be altogether inconsistent.

320 The force that produces, the intellect that orders, the goodness that perfects all things, is the supreme Being. Evil, defect, negation, is not the object of God's creative power. From motion the Peripatetics trace out a first immoveable Mover. The Platonics make God author of all good, author of no evil, and unchangeable. According to Anaxagoras there was a confused mass of all things in one chaos; but mind supervening, ἐπελθών,[4] distinguished and divided them. Anaxagoras, it seems, ascribed the motive faculty to mind; which mind some subsequent philosophers have accurately discriminated from soul and life, ascribing to it the sole faculty of intellection.

321 But still God was supposed the first agent, the source and original of all things, which He produceth, not occasionally

[1] [*i.e.* in terms of the distinction in Sect. 308, space is not apprehended in introspection, nor, as defined by Newton, in sense.—Ed.] [2] [*Timaeus*, 52 B. —Ed.] [3] [Berkeley makes this charge of circularity persistently—*Philos. Comm.*, 361, 618 (VOL. I of this ed., pp. 43 and 76); *Three Dialogues*, III (above, VOL. II, p. 241); and in a letter of 25 Nov. 1729 to Johnson (above, VOL. II, pp. 279f.). On gravity see *Siris*, Sects. 231ff., and *De motu*, Sects, 6, 11, 17.—Ed.] [4] [Diogenes Laertius, II, 6.—Ed.]

or instrumentally, but with actual and real efficacy. Thus the treatise *De Secretiore Parte Divinæ Sapientiæ secundum Ægyptios*, in the tenth book,[1] saith of God, that He is not only the first Agent, but also that He it is who truly acts or creates, *qui vere efficit.*

322 Varro, Tully, and St. Augustine, understand the soul to be *vis*, the power or force that acts, moves, enlivens. Now although, in our conception, *vis*, or spirit, might be distinguished from mind, it would not thence follow that it acts blindly or without mind, or that it is not closely connected with intellect. If Plutarch is to be trusted[2] in his account of the opinions of philosophers, Thales held the mind of the world to be God; Democritus held the soul of the world to be an igniform deity (Sects. 166, 168, 277); Pythagoras taught that God was the monad and the good, or τ'ἀγαθόν; Socrates also and Plato pronounced him to be the τὸ ἕν (Sect. 287), the single, self-originate one, essentially good. Each of which appellations and forms of speech directly tends to and determines in Mind, εἰς τὸν νοῦν σπεύδει, saith Plutarch.

323 Whence that author concludes that, in the sense of those philosophers, God is a Mind, χωριστὸν εἶδος—not an abstract idea compounded of inconsistencies, and prescinded from all real things, as some moderns understand abstraction;[3] but a really existing Spirit, distinct or separate from all sensible and corporeal beings. And although the Stoics are represented as holding a corporeal deity, or that the very system of the world is God, yet it is certain they did not, at bottom, dissent from the forementioned doctrine; inasmuch as they supposed the world to be an animal (Sects. 276, 279), consisting of soul or mind, as well as body.

324 This notion was derived from the Pythagoreans, who held the world, as Timæus Locrus teacheth,[4] to be one perfect animal, endued with soul and reason: but then they believed it to have been generated: whereas the Stoics looked on the world as the supreme God, including therein mind or intellect. For the elementary fire, or, if one may so speak, the animal spirit of

[1] [x, 4. See note on Sect. 269.—Ed.] [2] [ps.-Plut., *De plac. philos.*, I, 7.—Ed.] [3] [See *Principles*, Introduction, Sects. 6ff. for Berkeley's arguments that many so-called abstract ideas are both logically and psychologically impossible.—Ed.] [4] [*De anima mundi*, 2 (in Mullach, *Frag. philos. Graec.*, VOL. II, p. 38[b]). On Timaeus see note on Sect. 282; on the world as animate, note on Sect. 153. —Ed.]

the world, seemeth, according to them, to have been the vehicle of the soul (Sects. 277, 284), the vehicle of intellect or νοῦς ; since they styled the Divinity πῦρ νοερόν (Sect. 272), or intellectual fire.

325 The Egyptians, if we may credit the Hermaic writings, maintained God to be all things, not only actual, but possible. He is styled by them, That which is made and that which is unmade. And therein it is said, 'Shall I praise thee for those things thou hast made manifest, or for the things thou hast hidden?'[1] Therefore, in their sense, to manifest was to create, the things created having been before hidden in God.

326 Now, whether the νοῦς be abstracted from the sensible world, and considered by itself, as distinct from, and presiding over, the created system; or whether the whole universe, including mind together with the mundane body, is conceived to be God (Sect. 300), and the creatures to be partial manifestations of the divine essence; there is no atheism in either case, whatever misconceptions there may be, so long as mind or intellect is understood to preside over, govern, and conduct, the whole frame of things. And this was the general prevailing opinion among the philosophers.

327 Nor if any one, with Aristotle in his *Metaphysics*,[2] should deny that God knows anything without Himself, seeing that God comprehends all things, could this be justly pronounced an atheistical opinion. Nor even was the following notion of the same author to be accounted atheism, to wit, that there are some things beneath the knowledge of God, as too mean, base and vile; however wrong this notion may be, and unworthy of the divine perfection.

328 Might we not conceive that God may be said to be All in divers senses?—as He is the cause and origin of all beings; as the νοῦς is the νοητά, a doctrine both of Platonics and Peripatetics (Sects. 309, 310); as the νοῦς is the place of all forms; and as it is the same which comprehends and orders (Sect. 320) and sustains the whole mundane system. Aristotle declares that the divine force or influence permeates the entire universe (Sect. 173), and that what the pilot is in a ship, the driver in a

l 2 *soul, the vehicle of intellect—(A, B) soul of the world, and soul itself the vehicle of intellect; (E) soul, intellect.*

[1] [*Poimandres*, v, 11 (*Hermetica*, ed. by Scott, vol. I, p. 164).—Ed.] [2] [XII, 7 (1072[b], 20).—Ed.]

chariot, the precentor in a choir, the law in a city, the general in an army, the same God is in the world. This he amply sets forth in his book *De Mundo*,[1] a treatise which, having been anciently ascribed to him, ought not to be set aside from the difference of style, which (as Patricius [2] rightly observes), being in a letter to a king, might well be supposed to differ from the other dry and crabbed parts of his writings.

329 And although there are some expressions to be met with in the philosophers, even of the Platonic and Aristotelic sects, which speak of God as mixing with or pervading all nature and all the elements; yet this must be explained by force and not by extension, which was never attributed to the mind (Sects. 290, 293, 297, 319) either by Aristotle or Plato. This they always affirmed to be incorporeal; and, as Plotinus remarks,[3] incorporeal things are distant each from other not by place, but (to use his expression) by *alterity*.

330 These disquisitions will probably seem dry and useless to such readers as are accustomed to consider only sensible objects. The employment of the mind on things purely intellectual is to most men irksome, whereas the sensitive powers, by constant use, acquire strength. Hence, the objects of sense more forcibly affect us (Sects. 264, 294), and are too often counted the chief good. For these things men fight, cheat, and scramble. Therefore, in order to tame mankind, and introduce a sense of virtue, the best human means is to exercise their understanding, to give them a glimpse of another world, superior to the sensible, and, while they take pains to cherish and maintain the animal life, to teach them not to neglect the intellectual.

331 Prevailing studies are of no small consequence to a State, the religion, manners, and civil government of a country ever taking some bias from its philosophy, which affects not only the minds of its professors and students, but also the opinions of all the better sort, and the practice of the whole people, remotely and consequentially indeed, though not inconsiderably. Have

[1] [Ch. 6, 400^b, 5. See note on Sect. 167.—Ed.] [2] [Francesco Patrizzi (1529–97), Italian Neoplatonist, who attacked Aristotelianism as inconsistent with Christianity in *Discussiones peripateticae* (1581) and *Nova de universis philosophia* (1591). In the latter work his doctrine resembles Berkeley's at two points—he insists that matter is inactive, and he makes Light (though incorporeal, unlike Berkeley) God's first instrument in Nature.—Ed.] [3] [*Enn.*, VI, iv, 4. Berkeley's friend Johnson had thought that separation of minds implies difference of location (see above, VOL. II, p. 276, para. 10). —Ed.]

not the polemic and Scholastic philosophy been observed to produce controversies in law and religion? And have not Fatalism and Sadducism[1] gained ground during the general passion for the corpuscularian and mechanical philosophy, which hath prevailed for about a century? This, indeed, might usefully enough have employed some share of the leisure and curiosity of inquisitive persons. But when it entered the seminaries of learning as a necessary accomplishment, and most important part of education, by engrossing men's thoughts, and fixing their minds so much on corporeal objects and the laws of motion, it hath, however undesignedly, indirectly and by accident, yet not a little indisposed them for spiritual, moral, and intellectual matters. Certainly had the philosophy of Socrates and Pythagoras prevailed in this age among those who think themselves too wise to receive the dictates of the Gospel, we should not have seen interest take so general and fast hold on the minds of men, nor public spirit reputed to be γενναῖαν εὐήθειαν, a generous folly, among those who are reckoned to be the most knowing as well as the most getting part of mankind.[2]

332 It might very well be thought serious trifling to tell my readers that the greatest men had ever a high esteem for Plato; whose writings are the touchstone of a hasty and shallow mind; whose philosophy has been the admiration of ages; which supplied patriots, magistrates, and lawgivers to the most flourishing States, as well as fathers to the Church, and doctors to the Schools. Albeit in these days the depths of that old learning are rarely fathomed; and yet it were happy for these lands if our young nobility and gentry, instead of modern maxims, would imbibe the notions of the great men of antiquity. But, in these free-thinking times, many an empty head is shook at Aristotle and Plato, as well as at the Holy Scriptures. And the writings of those celebrated ancients are by most men treated on a foot with the dry and barbarous lucubrations of the Schoolmen. It may be modestly presumed there are not many among us, even of those who are called the better sort, who have more sense, virtue, and love of their country than Cicero, who in a letter to

[1] [The denial of immortality. In *Sadducismus triumphatus* (1681) Joseph Glanvill uses the term for the denial of supernatural apparitions.—Ed.] [2] [Berkeley had argued against the egoists in *Alciphron*, DIAL. II; and this work concludes with regret, like the text above, over the contemporary neglect of the ancient Greek thinkers.—Ed.]

Atticus[1] could not forbear exclaiming, *O Socrates et Socratici viri! numquam vobis gratiam referam.* Would to God many of our countrymen had the same obligations to those Socratic writers! Certainly, where the people are well educated, the art of piloting a state is best learned from the writings of Plato. But among bad men, void of discipline and education, Plato, Pythagoras, and Aristotle themselves, were they living, could do but little good. Plato hath drawn a very humorous and instructive picture of such a State; which I shall not transcribe for certain reasons. But whoever has a mind may see it in page 78 of the second tome of Aldus's edition of Plato's works.[2]

333 Proclus, in the first book of his *Commentary on the Theology of Plato*,[3] observes that, as in the mysteries, those who are initiated at first meet with manifold and multiform gods, but being entered and thoroughly initiated they receive the divine illumination and participate the very Deity; in like manner, if the soul look abroad, she beholds the shadows and images of things, but returning into herself she unravels and beholds her own essence. At first she seemeth only to behold herself, but having penetrated farther she discovers the mind. And again, still farther advancing into the innermost sanctuary of the soul, she contemplates the θεῶν γένος. And this, he saith, is the most excellent of all human acts, in the silence and repose of the faculties of the soul to tend upwards to the very Divinity, to approach and be closely joined with that which is ineffable and superior to all beings. When come so high as the first principle, she ends her journey and rests. Such is the doctrine of Proclus.

334 But Socrates in the *First Alcibiades*[4] teacheth, on the other hand, that the contemplation of God is the proper means to know or understand our own soul. As the eye, saith he, looking steadfastly at the visive part or pupil of another eye, beholds itself, even so the soul beholds and understands herself while she contemplates the Deity, which is wisdom and virtue, or like thereunto. In the *Phædon*,[5] Socrates speaks of God as being

[1] [*Epist. ad Atticum*, XIV, 9.—Ed.] [2] [1513, Venice (the *editio princeps* of Plato's works in Greek). *Republic*, 488. The satirical passage is *short* enough to be transcribed. It did not fit the Britain or Ireland of Berkeley's day, but it would fit the sort of society which, in his view, would result if the 'free-thinkers' had their way. On these he had let loose his satire in *Alciphron*.—Ed.] [3] [*In Platon. theol.*, I, 3.—Ed.] [4] [Plato, *Alc. I*, p. 133, on which Proclus, in the passage mentioned in the foregoing section, is commenting.—Ed.] [5] [Plato, *Phaedo*, 99 c.—Ed.]

τἀγαθὸν and τὸ δέον, the good and the decent (Sects. 260, 220); Plotinus represents God as order[1]; Aristotle as law.[2]

335 It may seem, perhaps, to those who have been taught to discourse about substratums, more reasonable and pious to attribute to the Deity a more substantial being than the notional entities of wisdom, order, law, virtue, or goodness, which being only complex ideas, framed and put together by the understanding, are its own creatures, and have nothing substantial, real, or independent in them. But it must be considered that, in the Platonic system, order, virtue, law, goodness, and wisdom are not creatures of the soul of man, but innate and originally existent therein, not as an accident in a substance, but as light to enlighten, and as a guide to govern. In Plato's style, the term *idea* doth not merely signify an inert inactive object of the understanding, but is used as synonymous with αἴτιον and ἀρχή, cause and principle. According to that philosopher, goodness, beauty, virtue, and suchlike are not figments of the mind, nor mere mixed modes,[3] nor yet abstract ideas in the modern sense, but the most real beings, intellectual and unchangeable, and therefore more real than the fleeting, transient objects of sense (Sect. 306), which, wanting stability, cannot be subjects of science (Sects. 264, 266, 297), much less of intellectual knowledge.

336 By Parmenides, Timæus, and Plato a distinction was made, as hath been observed already, between *genitum* and *ens*. The former sort is always generating or *in fieri* (Sects. 304, 306), but never exists, because it never continues the same, being in a constant change, ever perishing and producing. By *entia* they understand things remote from sense, invisible and intellectual, which never changing are still the same, and may therefore be said truly to exist: οὐσία, which is generally translated substance, but more properly essence, was not thought to belong to things sensible and corporeal, which have no stability; but rather to intellectual ideas, though discerned with more difficulty, and making less impression on a mind stupefied and immersed in animal life than gross objects that continually beset and solicit our senses.

337 The most refined human intellect, exerted to its utmost reach, can only seize some imperfect glimpses of the divine Ideas

l 1 *the good and the decent (not in E).*

[1] [III. v, 5.—Ed.] [2] [ps.-Aristotle, *De mundo*, VI (400[b], 28). Cp. Sect. 328. —Ed.] [3] [A technical term in Locke's *Essay conc. Human Understanding*, II, xxii .2. On abstract ideas see Berkeley's *Principles*, Introduction, Sects. 6ff.—Ed.]

(Sects. 313, 330), abstracted from all things corporeal, sensible, and imaginable. Therefore Pythagoras and Plato [1] treated them in a mysterious manner, concealing rather than exposing them to vulgar eyes; so far were they from thinking that those abstract things, although the most real, were the fittest to influence common minds, or become principles of knowledge, not to say duty and virtue, to the generality of mankind.

338 Aristotle [2] and his followers have made a monstrous representation of the Platonic Ideas; and some of Plato's own school have said very odd things concerning them. But if that philosopher himself was not read only, but studied also with care, and made his own interpreter, I believe the prejudice that now lies against him would soon wear off (Sects. 309, 313), or be even converted into a high esteem for those exalted notions and fine hints that sparkle and shine throughout his writings, which seem to contain not only the most valuable learning of Athens and Greece, but also a treasure of the most remote traditions and early science of the East.

339 In the *Timæus* of Plato[3] mention is made of ancient persons, authors of traditions, and the offspring of the gods. It is very remarkable that, in the account of the creation contained in the same piece, it is said that God was pleased with His work, and that the night is placed before the day.[4] The more we think, the more difficult shall we find it to conceive how mere man, grown up in the vulgar habits of life, and weighed down by sensuality, should ever be able to arrive at science without some tradition (Sects. 298, 310, 302) or teaching, which might either sow the seeds of knowledge, or call forth and excite those latent seeds that were originally sown in the soul.

340 Human souls in this low situation, bordering on mere animal life, bear the weight and see through the dusk of a gross atmosphere, gathered from wrong judgments daily passed, false opinions daily learned, and early habits of an older date than either judgment or opinion. Through such a medium the sharpest eye cannot see clearly (Sects. 292, 293, 294). And if by some extraordinary effort the mind should surmount this dusky region, and snatch a glimpse of pure light, she is soon drawn backward and depressed by the heaviness of the animal nature to which she is chained. And if again she chanceth, amidst the

[1] [Pythagoras in Diogenes Laertius, VIII, 15; Plato in Sect. 365 below.—Ed.]
[2] [*Metaphysics*, I, 9 (990ᵃ, 33ff.) is perhaps chiefly in view.—Ed.] [3] [23.—Ed.]
[4] [*Op. cit.*, 37 C.—Ed.]

agitation of wild fancies and strong affections, to spring upwards, a second relapse speedily succeeds into this region of darkness and dreams.

341 Nevertheless, as the mind gathers strength by repeated acts, we should not despond, but continue to exert the prime and flower of our faculties, still recovering, and reaching on, and struggling into the upper region, whereby our natural weakness and blindness may be in some degree remedied, and a taste attained of truth and intellectual life. Beside the constant prevailing opinion of the greatest men of antiquity, that there is both a universal Spirit, author of life and motion, and a universal Mind, enlightening and ordering all things, it was a received tenet among them that there is also τὸ ἓν or τἀγαθόν (Sect. 329), which they looked on as the *Fons Deitatis*, the first hypostasis [1] in the Divinity.

342 The one, or τὸ ἕν, being immutable and indivisible, always the same and entire, was therefore thought to exist truly and originally, and other things only so far as they are one and the same, by participation of the τὸ ἕν. This gives unity, stability, reality, to things (Sects. 264, 306). Plato describes God, as Moses,[2] from His being. According to both, God is He who truly is, ὁ ὄντως ὤν.[3] Change and division were esteemed defects or bad. Evil scatters, divides, destroys. Good, on the contrary, produceth concord and union, assembles, combines, perfects, and preserves entire. The several beings which compose the universe are parts of the same system; they combine to carry on one end, and perfect one whole. And this aptness and concurrence thereunto furnishes the partial particular idea of good in the distinct creatures. Hence it might have come to pass that τἀγαθὸν and τὸ ἓν were regarded as one and the same.

343 Light and sight (saith Plato in the sixth book of his *Republic*) [4] are not the sun: even so truth and knowledge are not the Good itself, although they approach thereunto. And again, what the sun is in a visible place with respect to sight and things seen, that same is τἀγαθὸν or Good in an intelligible place with

l 19 *the* τὸ—(*A, B, E*) τὸ.

[1] ['Hypostasis' etymologically means 'substance'. As used by the Greek Fathers, it was translated in the West by *persona*. That the One is the first hypostasis of Deity, and identical with Plato's Good, is the doctrine of the Neoplatonists, not of the Greek philosophers generally.—Ed.]
[2] ['I am that I am,' *Exod.* iii, 14.—Ed.] [3] [See Sect. 268.—Ed.]
[4] [508.—Ed.]

respect to understanding and things understood. Therefore the Good or One is not the light that enlightens, but the source of that light.

344 Every moment produceth some change in the parts of this visible creation. Something is added or diminished, or altered in essence, quantity, quality, or habitude. Wherefore all generated beings were said by the ancients to be in a perpetual flux (Sects. 304, 336). And that which, on a confused and general view, seems one single constant being, shall upon a nearer inspection appear a continued series of different beings. But God remains for ever one and the same. Therefore God alone exists.[1] This was the doctrine of Heraclitus, Plato, and other ancients.

345 It is the opinion of Plato and his followers that in the soul of man, prior and superior to intellect, there is somewhat of a higher nature, by virtue of which we are one; and that by means of our one or unit, we are most closely joined to the Deity. And as by our intellect we touch the divine Intellect, even so by our τὸ ἕν or unit, the very flower of our essence, as Proclus expreseth it,[2] we touch the first One.

346 According to the Platonic philosophy, *ens* and *unum* are the same. And consequently our minds participate so far of existence as they do of unity. But it should seem that personality is the indivisible centre of the soul or mind,[3] which is a monad so far forth as she is a person. Therefore person is really that which exists, inasmuch as it participates of the divine unity. In man the monad or indivisible is the αὐτὸ τὸ αὐτό, the self-same self or very self, a thing in the opinion of Socrates[4] much and narrowly to be inquired into and discussed, to the end that, knowing ourselves, we may know what belongs to us and our happiness.

347 Upon mature reflection, the person or mind of all created beings seemeth alone indivisible, and to partake most of unity. But sensible things are rather considered as one than truly so,[5] they being in a perpetual flux or succession, ever differing and

l 26 *of the*—(*A*, *B*, *E*) *the.*

[1] [In the sense defined in Sect. 336.—Ed.] [2] [*In Platon. theol.*, III. 1.—Ed.] [3] [An echo of the famous definition given by Boëthius: 'Persona rationabilis naturae individua substantia' (*Liber de Persona*, ch. 4; in Migne, *Patrologia Latina*, VOL. 64, col. 1345)—which is quoted by St. Thomas in *Summa Theol.*, I, qu. 29, art. 1.—Ed.] [4] [Plato, *Alc. I*, 129 B, 130 D. Cp. *Charm.*, 164 D and *Apol.*, 28 E, 29 E.—Ed.] [5] [See note on Sect. 288.—Ed.]

various. Nevertheless, all things together may be considered as one universe (Sects. 287, 288), one by the connection, relation, and order of its parts, which is the work of mind, whose unit is, by Platonics, supposed a participation of the first τὸ ἕν.

348 Socrates, in the *Theætetus* of Plato, speaketh of two parties of philosophers—the ῥέοντες and οἱ τοῦ ὅλου στασιῶται,[1] the flowing philosophers who held all things to be in a perpetual flux, always generating and never existing, and those others who maintained the universe to be fixed and immovable. The difference seems to have been this, that Heraclitus, Protagoras, Empedocles, and in general those of the former sect, considered things sensible and natural; whereas Parmenides and his party considered τὸ πᾶν not as the sensible but as the intelligible world (Sects. 293, 294, 295), abstracted from all sensible things.

349 In effect, if we mean by *things* the sensible objects, these, it is evident, are always flowing; but if we mean things purely intelligible, then we may say on the other hand, with equal truth, that they are immovable and unchangeable. So that those who thought the Whole, or τὸ πᾶν, to be ἓν ἑστώς, a fixed or permanent One, seem to have understood the Whole of real beings, which in their sense was only the intellectual world, not allowing reality of being to things not permanent.

350 The displeasure of some readers may perhaps be incurred by surprising them into certain reflections and inquiries for which they have no curiosity. But perhaps some others may be pleased to find a dry subject varied by digressions, traced through remote inferences, and carried into ancient times, whose hoary maxims (Sects. 298, 301), scattered in this essay, are not proposed as principles, but barely as hints to awaken and exercise the inquisitive reader, on points not beneath the attention of the ablest men. Those great men, Pythagoras, Plato, and Aristotle, the most consummate in politics, who founded States, or instructed princes, or wrote most accurately on public government, were at the same time most acute at all abstracted and sublime speculations; the clearest light being ever necessary to guide the most important actions. And, whatever the world thinks, he who hath not much meditated upon God, the human mind, and the *summum bonum*, may possibly make a thriving

l 39 *thriving—(A, B) able.*

[1] [181 A.—Ed.]

earthworm, but will most indubitably make a sorry patriot and a sorry statesman.

351 According to the nice metaphysics of those ancient philosophers, τὸ ἕν, being considered as what was first and simplest in the Deity, was prescinded even from entity, to which it was thought prior and superior; and is therefore by the Platonics styled super-essential.[1] And in the *Parmenides* it is said, τὸ ἕν doth not exist;[2] which might seem to imply a negation of the divine Being. The truth is, Zeno and Parmenides argued that a thing existing in time was older and younger than itself; therefore the constant immutable τὸ ἕν did not exist in time; and if not in time, then in none of the differences of time past, present, or to come; therefore we cannot say that it was, is, or will be. But, nevertheless, it is admitted in the same *Parmenides*[3] that τὸ νῦν is everywhere present to τὸ ἕν; that is, instead of a temporary succession of moments, there is one eternal now, or *punctum stans*, as it is termed by the Schoolmen.

352 The simplicity of τὸ ἕν (the Father in the Pythagoric and Platonic Trinity) is conceived such as to exclude intellect or mind, to which it is supposed prior; and that hath created a suspicion of atheism in this opinion: for, saith the learned Doctor Cudworth,[4] shall we say that the first Hypostasis or Person is ἄνους and ἄλογος, senseless and irrational, and altogether devoid of mind and understanding? Or would not this be to introduce a kind of mysterious atheism? To which it may be answered that whoever acknowledgeth the universe to be made and governed by an eternal mind cannot be justly deemed an atheist (Sects. 154, 276, 279, 287). And this was the tenet of those ancient philosophers. In the Platonic[5] doctrine, the generation of the νοῦς or λόγος was not contingent but necessary, not temporary but from everlasting. There never was a time supposed wherein τὸ ἕν subsisted without intellect; the priority having been understood only as a priority of order or conception, but not a priority of age. Therefore, the maintaining a dis-

l 34 *or*—(*B*) *and.*

[1] [Plato, *Republic*, 509 B; Plotinus, VI.viii, 14.—Ed.] [2] [Plato, *Parmen.*, 141.—Ed.] [3] [*Ibid.*, 152 E. Berkeley had referred to this notion of an everlasting present in a letter to Johnson of 1730 (above, VOL. II, p. 293.—Ed.] [4] [*True intellectual System*, BK. I, 4. XXXVI (1845 edn., VOL. II, p. 397).—Ed.] [5] [Neoplatonic. Until the nineteenth century the term 'Platonism' covered the doctrines of Plotinus and his followers, as well as of Plato.—Ed.]

tinction of priority between τὸ ἕν and νοῦς doth not infer that the one ever existed without the other. It follows, therefore, that the Father or τὸ ἕν may, in a certain sense, be said to be ἄνους without atheism, or without destroying the notion of a Deity;[1] any more than it would destroy the notion of a human soul, if we should conceive a distinction between self and intellect, or intellect and life. To which we may farther add, that it is a doctrine of Platonics, and agrees with their master's tenets, to say that τὸ ἕν or the first Hypostasis contains all excellence and perfection, whereof it is the original source, and is *eminenter*, as the Schools speak, intellect and life, as well as goodness; while the second Hypostasis is essentially intellect, and, by participation, goodness and life; and the third, life essentially, and, by participation, goodness and intellect.

353 Therefore, the whole being considered, it will not seem just to fix the imputation of atheism upon those philosophers who held the doctrine of τὸ ἕν, whether it be taken in an abstracted or collective, a metaphysical or merely vulgar meaning (Sect. 300): that is, whether we prescind unity from essence and intellect, since metaphysical distinctions of the divine attributes do not in reality divide them; or whether we consider the universal system of beings as One, since the union, connexion, and order of its members do manifestly infer a mind or intellect to be the cause thereof.

354 THE ONE or τὸ ἕν may be conceived either by composition or division. For as, on the one hand, we may say the world or universe is one whole, or one animal; so we may, on the other hand, consider THE ONE, τὸ ἕν, by division or abstraction, as somewhat in the order of things prior to mind. In either sense there is no atheism, so long as mind is admitted to preside and direct the animal; and so long as the *Unum* or τὸ ἕν is supposed not to exist without mind (Sects. 287, 288). So that neither Heraclitus, nor Parmenides, nor Pythagoras, nor Plato, neither the Egyptians, nor Stoics, with their doctrine of a divine Whole or Animal, nor Xenophanes with his ἓν καὶ πᾶν, are justly to be

l 8 *to say* (*not in B*). *l* 25 THE ONE or (*not in C*). *l* 28 THE ONE (*not in A, B, E*).

[1] [On the 'negative theology' (*i.e.* only negative predicates are applicable to God) see further *Alciphron*, IV, 16–22, where Berkeley argues that our knowledge of God, though analogical, is positive. He is more positive in outlook than St. Augustine, who says of God: 'dictum est tres personae non ut illud diceretur sed ne taceretur omnino' (*De Trin.*, V, 8. X).—Ed.]

accounted atheists. Therefore, modern atheism, be it of Hobbes, Spinoza, Collins,[1] or whom you will, is not to be countenanced by the learning and great names of antiquity.

355 Plato teacheth [2] that the doctrine concerning the One or Unit is a means to lead and raise the mind to the knowledge of Him who truly is (Sects. 294, 295). And it is a tenet both of Aristotle and Plato that identity is a certain unity. The Pythagoreans also, as well as the Platonic philosophers, held *unum* and *ens* to be the same. Consistently with which, that only can be said to exist which is one and the same. In things sensible and imaginable, as such, there seems to be no unity, nothing that can be called one, prior to all act of the mind ;[3] since they, being in themselves aggregates, consisting of parts or compounded of elements, are in effect many. Accordingly, it is remarked by Themistius,[4] the learned interpreter of Aristotle, that to collect many notions into one, and to consider them as one, is the work of intellect and not of sense or fancy.

356 Aristotle himself, in his third book *Of the Soul*, saith it is the mind that maketh each thing to be one—τὸ δὲ ἓν ποιοῦν, τοῦτο ὁ νοῦς ἕκαστον.[5] How this is done, Themistius is more particular,[6] observing that, as being conferreth essence, the mind, by virtue of her simplicity, conferreth simplicity upon compounded beings. And, indeed, it seemeth that the mind, so far forth as person, is individual (Sects. 345, 346, 347), therein resembling the divine One by participation, and imparting to other things what itself participates from above. This is agreeable to the doctrine of the ancients, however the contrary opinion of supposing number to be an original primary quality in things,[7] independent of the mind, may obtain among the moderns.

357 The Peripatetics taught that in all divisible things there was somewhat indivisible, and in all compound things somewhat simple. This they derived from an act of the mind. And neither this simple indivisible unit, nor any sum of repeated units, consequently no number, can be separated from the things themselves, and from the operation of the mind. Themistius [8]

[1] [Anthony Collins (1676–1729), author of several deistic writings, whom Berkeley had attacked earlier. See my Introduction to *Alciphron*, above, VOL. III, p. 5.—Ed.] [2] [*Republic*, 525 A.—Ed.] [3] [See note on Sect. 283.—Ed.] [4] [*De anima*, VI. 6 (p. 202, 17); *Comment. in Arist. Graeca*, VOL. V, PART III, p. 110. —Ed.] [5] [Ch. 6 (430^b, 5).—Ed.] [6] [*Loc. cit.*—Ed.] [7] [*e.g.* Locke, *Essay conc. Human Understanding*, II, 8. ix.—Ed.] [8] [The reference seems to be to his notes on Aristotle's *De anima*, III, 6 (*Comm. in Arist. Graeca*, VOL. V, PART II, p. 111, line 1).—Ed.]

goeth so far as to affirm that it cannot be separated from the words or signs; and, as it cannot be uttered without them, so, saith he, neither can it be conceived without them. Thus much upon the whole may be concluded, that, distinct from the mind and her operations, there is in created beings neither unit nor number.

358 Of inferior beings the human mind, self, or person, is the most simple and undivided essence (Sect. 347). And the supreme Father is the most perfect One. Therefore the flight of the mind towards God is called by the Platonics φυγὴ μόνου πρὸς μόνον.[1] The supreme Being, saith Plotinus, as He excludes all diversity,[2] is ever alike present. And we are then present to Him when, recollected and abstracted from the world and sensible objects, we are most free and disengaged from all variety (Sect. 268). He adds that in the intuition of the Supreme Deity the soul finds her wished-for end and repose; which that philosopher calls awaking out of his body into himself.

359 In the tenth book of the *Arcane*, or *Divine Wisdom of the Egyptians*,[3] we are taught that the supreme Being is not the cause of any created thing; but that He produced or made the Word; and that all created beings were made by the Word, which is accordingly styled the Cause of all causes; and that this was also the doctrine of the Chaldeans. Plato, likewise, in his Letter to Hermias, Erastus, and Coriscus,[4] speaks of God, the ruler and cause of all things, as having a Father: and, in his *Epinomis*, he expressly teacheth that the Word or λόγος made the world. Accordingly, Saint Augustine, in his commentary on the beginning of Saint John's Gospel,[5] having declared that Christ is the wisdom of God by which all things were made, observes that this doctrine was also found in the writings of philosophers, who taught that God had an only begotten Son by whom are all things.

360 Now, though Plato had joined with an imagination the most splendid and magnificent, an intellect not less deep and clear, yet it is not to be supposed that either he or any other philosophers of Greece or the East had by the light of nature attained an adequate notion of the Holy Trinity; nor even

[1] [Plotinus, VI. ix, 11, the closing words of the *Enneads*, commonly translated 'the flight of the alone to the Alone,' and rightly understood by Berkeley as 'the one to the One.'—Ed.] [2] [V.v, 8 f.; VI.v, 9.—Ed.] [3] [x, 17. See note on Sect. 269.—Ed.] [4] [*Epist.*, 6, 323 D; *Epinomis* (probably not by Plato), 986 C.—Ed.] [5] [*In Johannis Evangelium*, Tract. 11, 4 (Migne, *Patrologia Latina*, VOL. 35, col. 1390).—Ed.]

that their imperfect notion, so far as it went, was exactly just; nor perhaps that those sublime hints, which dart forth like flashes of light in the midst of a profound darkness, were originally struck from the hard rock of human reason, but rather derived, at least in part, by a divine tradition (Sects. 298, 301), from the author of all things. It seems a remarkable confirmation of this, what Plotinus observes in his fifth *Ennead*, that this doctrine of a Trinity—Father, Mind, and Soul—was no late invention, but an ancient tenet.[1]

361 Certain it is that the notion of a Trinity is to be found in the writings of many old heathen philosophers—that is to say, a notion of three divine Hypostases. Authority, Light, and Life did, to the eye of reason, plainly appear to support, pervade, and animate the mundane system or macrocosm. The same appeared in the microcosm, preserving soul and body, enlightening the mind, and moving the affections. And these were conceived to be necessary universal principles, co-existing and co-operating in such sort as never to exist asunder, but on the contrary to constitute one Sovereign of all things. And, indeed, how could power or authority avail or subsist without knowledge? Or either without life and action?

362 In the administration of all things, there is authority to establish, law to direct, and justice to execute. There is first the source of all perfection, or *Fons Deitatis;* secondly, the supreme reason, order, or λόγος; and lastly, the spirit, which quickens and inspires. We are sprung from the Father, irradiated or enlightened by the Son, and moved by the Spirit. Certainly, that there is Father, Son, and Spirit; that these bear analogy to the sun, light, and heat; and are otherwise expressed by the terms Principle, Mind, and Soul, by One or τὸ ἕν, Intellect, and Life, by Good, Word, and Love; and that generation was not attributed to the second Hypostasis, the νοῦς or λόγος, in respect of time (Sect. 352), but only in respect of origin and order, as an eternal necessary emanation; these are the express tenets of Platonists, Pythagoreans, Egyptians, and Chaldeans.

363 Though it may be well presumed there is nothing to be found on that sublime subject in human writings which doth

l 7 *observes*—(*E*) *observed.*

[1] [Ch. i, 8. The identification of the Neoplatonic hypostases (the One, Intellect, Soul of the world) with the Christian Trinity had been discussed by R. Cudworth in *True intellectual System*, 1678, BK. I, 4, XXXVI (1845 edn., VOL. II, esp. pp. 389 and 427).—Ed.]

not bear the sure signatures of humanity, yet it cannot be denied that several Fathers of the Church have thought fit to illustrate the Christian doctrine of the Holy Trinity by similitudes and expressions borrowed from the most eminent heathens, whom they conceived to have been no strangers to that mystery, as hath been plainly proved by Bessarion, Eugubinus,[1] and Dr. Cudworth.

364 Therefore, how unphilosophical soever that doctrine may seem to many of the present age, yet it is certain the men of greatest fame and learning among the ancient philosophers held a Trinity in the Godhead. It must be owned that upon this point some later Platonists of the Gentile world seem to have bewildered themselves (as many Christians have also done) while they pursued the hints derived from their predecessors with too much curiosity.

365 But Plato himself considered that doctrine as a venerable mystery, not to be lightly treated of, or rashly divulged. Wherefore in a letter to Dionysius,[2] he writes (as he himself professeth) enigmatically and briefly in the following terms, which he giveth for a summary of his notion concerning the supreme Being, and which, being capable of divers senses, I leave to be deciphered by the learned reader: *Περὶ τὸν πάντων βασιλέα πάντ' ἐστι, καὶ ἐκείνου ἕνεκα πάντα, καὶ ἐκεῖνο αἴτιον ἁπάντων τῶν καλῶν, δεύτερον δὲ περὶ τὰ δεύτερα, καὶ τρίτον περὶ τὰ τρίτα* Plato enjoins Dionysius, over and over, with great earnestness, not to suffer what he communicates concerning the mystery of the divine nature to fall into illiterate or vulgar hands, giving it withal as a reason for this caution, that nothing would seem more ridiculous or absurd to the common run of mankind. He adds that, in regard writings might miscarry, the prudent way was

l 26 *mystery*—(*E*) *mysteries.*

[1] [Johannes Bessarion (*c.* 1395–1472, the Greek scholar who became a Roman cardinal and promoted the revival of letters), *Contra calumniatorem Platonis*, LIB. II, C. 3. Agostino Steucho, called Eugubinus (1496–1549, prefect of the Vatican Library), *De perenni philosophia*, 1540, LIB. II, cc. 6 ff.—Ed.] [2] [*Epist.* 2, 312 E and 314. Whether the letter is genuine or no is still a matter of controversy. The text might be rendered: 'All things are related to the Sovereign of all things, and all things are for the sake of Him; and that is the cause of all things that are excellent. There is a Second related to the second things, and a Third to the third things.' What this means I do not know. The Alexandrian Fathers took the passage for an anticipation of the Christian doctrine of the Trinity (*e.g.* Clement quotes the passage in *Stromateis*, v. xiv, 103; cp. *Protrepticus*, vi. p. 60).—Ed.]

to write nothing at all on those matters, but to teach and learn them by word of mouth: 'for which reason,' saith he, 'I have never wrote anything thereon, nor is there, nor shall there ever be, anything of Plato's extant on that subject.' He farther adds, 'As for what hath been now said, it belongs all to Socrates.'

366 And, indeed, what this philosopher in his *Phædrus*[1] speaketh of the super-celestial region, and the Divinity resident therein, is of a strain not to be relished or comprehended by vulgar minds; to wit, essence really existent, object of intellect alone, without colour, without figure, without any tangible quality. He might very justly conceive that such a description must seem ridiculous to sensual men.

367 As for the perfect intuition of divine things, that he supposeth to be the lot of pure souls, beholding by a pure light, initiated, happy, free, and unstained from those bodies wherein we are now imprisoned like oysters. But in this mortal state we must be satisfied to make the best of those glimpses within our reach (Sects. 335, 337). It is Plato's remark, in his *Theætetus*,[2] that while we sit still we are never the wiser, but going into the river, and moving up and down, is the way to discover its depths and shallows. If we exercise and bestir ourselves, we may even here discover something.

368 The eye by long use comes to see even in the darkest cavern: and there is no subject so obscure but we may discern some glimpse of truth by long poring on it. Truth is the cry of all, but the game of a few. Certainly, where it is the chief passion, it doth not give way to vulgar cares and views; nor is it contented with a little ardour in the early time of life, active perhaps to pursue, but not so fit to weigh and revise. He that would make a real progress in knowledge must dedicate his age as well as youth, the later growth as well as first fruits, at the altar of Truth.

Cujusvis est errare, nullius nisi insipientis in errore perseverare.

CICERO[3]

[1] [247 C.—Ed.] [2] [200 E.—Ed.] [3] [*Orat. Philip.*, XII, 2.—Ed.]

Four Letters

and Farther Thoughts on Tar-water

Comprising
Three Letters to Thomas Prior,
a Letter to Dr. Hales,
and Farther Thoughts on Tar-water

First printed, the three letters to Prior in 1744, 1746 and 1747; the letter to Hales in 1747; and Farther Thoughts on Tar-water in 1752

EDITOR'S INTRODUCTION

THOMAS PRIOR (*c.* 1679–1751) was Berkeley's longest and probably his closest friend, as well as his adviser (and virtually his executor) in matters of business. Their correspondence is one of the chief sources of our knowledge of Berkeley's life. He entered Kilkenny College in Jan. 1697, six months later than Berkeley, and passed to Trinity College, Dublin, in 1699, a year before Berkeley. He was one of the founders of the Dublin Society (1731) and for some years its Secretary. This was but one expression of his versatile, practical and lifelong work for the betterment, material and mental, of Ireland: he ranks among the patriots of English extraction who, while loyal to the Crown, resented exploitation from England, and at the same time took practical steps to deal with misfortunes of local origin. Berkeley's *Querist* must have delighted him. He vigorously supported the advocacy of tar-water, among other ways by collecting and publishing reports of cures in his *Authentic Narrative of the Success of Tar-water* (1746, Dublin; also London). He was buried in his birthplace, Rathdowney, in the county of Leix. He is fitly recorded in the *Dictionary of National Biography*. A monument to him in Christ Church Cathedral, Dublin, bears the following finely composed inscription, written by Berkeley (I ignore the effective spacing into many lines):

> Memoriae sacrum Thomae Prior, viri, si quis unquam alius, de patria optime meriti: qui, cum prodesse mallet quam conspici, nec in senatum cooptatus, nec consiliorum aulae particeps, nec ullo publico munere insignitus, rem tamen publicam mirifice auxit et ornavit auspiciis, consiliis, labore indefesso: vir innocuus, probus, pius, partium studiis minime addictus, de re familiari parum solicitus, cum civium commoda unice spectaret: quicquid vel ad inopiae levamen vel ad vitae elegantiam facit, quicquid ad desidiam populi vincendam, aut ad bonas artes excitandas pertinet, id omne pro virili excoluit: Societatis Dubliniensis auctor, institutor, curator: quae fecerit pluribus dicere haud refert: quorsum narraret marmor illa quae omnes norunt, illa quae, civium animis insculpta, nulla dies delebit?

The first Letter was sent to Prior by Berkeley on 19 June 1744 (see private letter of this date), with the request to see to its publication in both Dublin and London. The London edition is listed in the *Gentleman's Magazine* in July. The piece was translated into French and into German in 1745, and into Dutch in 1747. An abridgement in one page appears in two editions of *Siris* (1744, London, 'new edition,' and 1747, London). The following are the English editions in Berkeley's lifetime, in what seems to me to be their chronological order (though the text of B is clearly the earliest, perhaps having lacked Berkeley's revising hand at the proof stage), with the letter-symbols used for each in the *apparatus criticus*. The text printed here is that of F iii.

A. 1744, Dublin (Faulkner)
B. 1744, London
C. 1744, Dublin (Gunne); 'second edition, with amendments,' appended to *Siris*, 'sec. ed.' Dublin.
D. 1744, London, 'Third edition'
E. 1744, Dublin (Faulkner); 'second edition, with amendments'
F. 1746. Appended to Prior's *Authentic Narrative*:
  i. 1746, Dublin
  ii. 1746, London
  iii. 1746, London, 'new edition.'

The second Letter appeared first in 1746, appended to the Dublin edition of Prior's *Authentic Narrative;* again with this in the London edition of the same year; and yet again in the same year in London in the 'new edition' of this. The text of this last is printed below, with the variant readings in the two earlier editions indicated by means of A and B respectively. The Letter was translated into Dutch in 1747.

The third Letter was published separately in Dublin in 1747, and reprinted in London in October of the same year along with the Letter to Hales, under the title *Two Letters from the Right Reverend Dr. George Berkeley . . . to Thomas Prior . . . to the Rev. Dr. Hales.* The texts are identical, except for a few misspellings in the London edition.[1]

[1] For an account of Prior, see Desmond Clarke, *Thomas Prior*, Royal Dublin Society, 1951 (pp. 60).

Three Letters to Thomas Prior

viz., A Letter to Thomas Prior, Esq., from the Author of *Siris*, containing some farther Remarks on the Virtues of Tar-water and the Methods for preparing it and using it; A second Letter from the Author of *Siris* to Thomas Prior, Esq., on the Virtues of Tar-water; and a Letter from the Author of *Siris* to Thomas Prior, Esq., concerning the Usefulness of Tar-water in the Plague. Wherein also it is considered whether Tar-water prepared with the distilled Acid of Tar should be preferred to that made in the common Way by mixing with Tar-water and stirring them together

The Text

First Letter 171
Second Letter 181
Third Letter 190

A LETTER

TO

THOMAS PRIOR, ESQ.

Non sibi, sed toti

'Nothing is more difficult and disagreeable than to argue men out of their prejudices; I shall not, therefore, enter into controversies on this subject, but, if men dispute and object, shall leave the decision to time and trial.'—*Siris*, Sect. 68.

1 AMONG the great numbers who drink tar-water in Dublin, your letter[1] informs me there are some that make or use it in an undue manner. To obviate these inconveniences, and render this water as generally useful as possible, you desire I would draw up some general rules and remarks in a small compass, which accordingly I here send you.

2[2] Pour a gallon of cold water on a quart of liquid tar in a glazed earthen vessel[3]; stir, mix, and work them thoroughly together with a wooden ladle or flat stick for the space of five or

l 3 (*A to E*) *T . . . P . . ..* *l* 8 (*Quotation from Siris not in A, B*). *l* 10 *some* —(*B*) *several.* *l* 11 *these*—(*A to F ii*) *those.* *l* 15 (*in A, and in B with omission of words bracketed, the whole section reads*) *Put a gallon of cold water to a quart of tar, stir and work them strongly together for about four minutes; let the vessel stand close covered for eight and forty hours,* [*or even, for better clarifying, three days and three nights,*] *that the tar may subside, then pour off the clear water, and keep it in bottles, well corked, for use. This is a good general rule, but as stomachs and constitutions are so various, it may admit of some latitude, the less water . . . weaker.* *l* 15 *in a glazed earthern vessel* (*not in C; D erratum—At the end of Sect.* 2 *add, It is to be noted that tar-water is best made in glazed earthern vessels*).

[1] [A private letter, not among those known to us.—Ed.] [2] [Cp. the directions in *Siris*, Sect. 1.—Ed.] [3] ['The tar-water is best made in glazed earthern vessels. I would have the foregoing sentence inserted in the English edition and next Irish edition of the Letter. . . . It is very lately that I made this remark, that it is finer and clearer when so made than if in unglazed crocks' (private letter to Prior, 3 Sept. 1774). The instruction is repeated in the third *Letter* (p. 198) and in *Farther Thoughts* (p. 207).—Ed.]

six minutes. Then let the vessel stand close covered three days and nights, that the tar may have full time to subside. After which, having first carefully skimmed it without moving the vessel, pour off the clear water, and keep it in bottles, well corked, for use. This method will produce a liquor stronger than that first published in *Siris*, but not offensive if carefully skimmed. It is a good general rule, but, as stomachs and constitutions are various, it may admit of some latitude. Less water or more stirring makes it stronger, as more water or less stirring makes it weaker. It is to be noted that if several gallons are made at once in the same vessel, you must add five or six minutes' stirring for every gallon. Thus two gallons of water and two quarts of tar require ten or twelve minutes' stirring.

3 The same tar will not do so well a second time, but may serve for other common uses: the putting off tar that hath been used for fresh tar would be a bad fraud. To prevent which, it is to be noted that tar already used is of a lighter brown than other tar. The only tar that I have used is that from our northern colonies in America, and that from Norway. The latter, being thinner, mixeth easier with water, and seems to have more spirit. If the former be made use of (as I have known with good success), the tar-water will require longer stirring to make it.

4 Tar-water, when right, is not paler than French, nor deeper coloured than Spanish white wine, and full as clear. If there be not a spirit very sensibly perceived in drinking, you may conclude the tar-water is not good: if you would have it good, see it made yourself. Those who begin with it little and weak may by habit come to drink more and stronger. According to the season, or the humour of the patient, it may be drank either cold or warm; in colics, I take it to be best warm. If it disgusts a patient warm, let him try it cold, and *vice versa*. If at first it creates to some squeamish persons a little sickness at stomach, or nauseating, it may be reduced both in quality and quantity. In general, small inconveniences are either removed, or borne with small trouble; it lays under no restraint as to air, exercise, clothes, or diet, and may be taken at all times of the year.

5 As to the quantity in common chronical indispositions, one pint of tar-water a day may suffice, taken on an empty stomach, at two or four times, to wit, night and morning, and about two

l 10 *It is to be noted . . . stirring* (*not in A to D*). *l* 15 *other* (*not in A, B*). *l* 21 *known*—(*A, B*) *sometimes known.* *l* 26 *see it*—(*A, B*) *you must see it.* *l* 30 *in colics . . . small trouble* (*not in B*). *l* 31 *to some squeamish persons* (*not in A*).

hours after dinner and breakfast; more may be taken by strong stomachs. Alteratives in general, taken in small doses, and often, mix best with the blood—how oft or how strong each stomach can bear, experience will shew. But those who labour under great and inveterate maladies must drink a greater quantity, at least one quart every twenty-four hours taken at four, six, or eight glasses, as best suits the circumstances and case of the drinker. All of this class must have much patience and perseverance in the use of this as well as all other medicines, which, if sure and safe, must yet, from the nature of things, be slow in the cure of inveterate chronical disorders. In acute cases, fevers of all kinds, it must be drank in bed, warm and in great quantity, the fever still enabling the patient to drink perhaps a pint every hour, which I have known to work surprising cures. But it works so quick, and gives such spirits, that the patients often think themselves cured before the fever hath quite left them. Such, therefore, should not be impatient to rise, or apply themselves too soon to business, or their usual diet.

6 To some, perhaps, it may seem that a slow alterative in chronical cases cannot be depended on in fevers and acute distempers, which demand immediate relief. But I affirm that this same medicine, which is a slow alterative in chronical cases, I have found to be also a most immediate remedy, when copiously taken, in acute and inflammatory cases. It might indeed be thought rash to have tried it in the most threatening fevers and pleurisies without bleeding, which in the common practice would have been held necessary. But for this I can say, that I have patients who would not be bled, and this obliged to make trials of tar-water without bleeding, which trials I never knew unsuccessful. The same tar-water I found a slow alterative, and a sudden febrifuge. If the reader is surprised, I own myself to be so too. But truth is truth, and from whatever hand it comes should be candidly received. If physicians think they have a right to treat of religious matters, I think I have an equal right to treat of medicine.

7 Authority I have no pretence to; but reason is the common birthright of all. My reasons I have given in *Siris*. My motives every one will interpret from his own breast. But he must own himself a very bad man, who in my case (that is, after long experience, and under full conviction of the virtues and innocence

l 6 *every twenty-four hours*—(*B*) *per diem*. *l* 14 *But it works* (*from here to end of Sect.* 7 *not in A, B*). *l* 28 *have*—(*C, D*) *had*.

of tar-water) would not have done as much. All men are, I will not say allowed, but obliged, to promote the common benefit, and, for this end, what I could not in conscience conceal, that I do and shall publicly declare, maugre all the spleen and raillery of a world which cannot treat me worse than it hath done my betters.

8 As the morning's draught is most difficult to nice stomachs, such may lessen or even omit it at the beginning, or rather postpone it till after breakfast, and take a larger dose at night: the distance from meal-time need not be more than one hour, for common stomachs, when the liquor is well clarified and skimmed. The oil that floats on the top and was skimmed off should be carefully laid by, and kept for outward sores. In the variety of cases and constitutions, it is not amiss that there should be different manners of preparing and taking tar-water. Trial will direct to the best. Whether there be any difference between old tar or new tar, or which of all the various tars, produced from different trees, or in different parts of the world, is most medicinal, future trials must determine.

9 I have a second sort of tar-water to be used externally as a wash or lotion for the itch, scabs, ulcers, evil, leprosy, and all such foul cases, which I have tried with very good success, and recommend it to the trial of others. For inveterate cases of that kind, tar-water should be drank, a quart every twenty-four hours, at four, six, or eight glasses: and, after this hath been done at least for a fortnight, the lotion is to be applied outwardly and warm, by bathing, fomenting, and steeping, and this several times in the twenty-four hours, to heal and dry up the sores, the drinking being still continued. This water, for external use, is made in the following manner: Pour two quarts of hot boiling water on a quart of tar; stir and work it strongly with a flat stick or ladle for a full quarter of an hour; let it stand six hours, then pour it off, and keep it close covered for use. It may be made weaker or stronger as there is occasion.

l 10 *for common . . . and kept—(A, B) when the stomach is strong or the glasses small: the oil that swims on the top may either be drank with the rest of the liquor or [for weak stomachs—(A) only] skimmed off and kept.* *l* 12 *floats—(C, D) floated.* *l* 13 *In the variety . . . the best (not in A, B).* *l* 20 *have—(D to F ii) have made.* *l* 21 *or lotion (not in B).* *l* 21 *evil (not in A, B).* *l* 22 *very good (not in B).* *l* 24 *twenty-four hours—(B) day.* *l* 25 *four (not in B).* *l* 25 *after this . . . lotion is to be—(B) at the same time the wash.* *l* 26 *at least for (not in A).* *l* 29 *the drinking . . . continued (not in B).* *l* 30 *is made—(A, B) must be made.* *l* 32 *for (not in C, D).* *l* 32 *six—(A, B) eight.*

10 From what I have observed of the lotion, I am inclined to think it may be worth while, in obstinate and cutaneous ailments, leprosy, and weakness of limbs, to try a bath of tar-water; allowing a gallon of tar to every ten gallons of boiling-hot water, stirring the ingredients a full half-hour, suffering the vessel to stand eight or ten hours before the water is poured off, and using the bath a little more than milk-warm. This experiment may be made in different proportions of tar and water. In Dublin many cases occur for trial which are not to be met with in the country.

11 My experiments have been made in various cases, and on many persons; and I make no doubt its virtues will soon be more fully discovered, as tar-water is now growing into general use, though not without that opposition which usually attends upon novelty. The great objection I find made to this medicine is that it promises too much. What, say the objectors, do you pretend to a *panacea*, a thing strange, chimerical, and contrary to the opinion and experience of all mankind? Now, to speak out, and give this objection or question a direct answer, I freely own that I suspect tar-water is a panacea. I may be mistaken, but it is worth trial: for the chance of so great and general a benefit, I am willing to stand the ridicule of proposing it. And as the old philosopher cried aloud from the house-tops to his fellow-citizens, 'Educate your children,' so, I confess, if I had a situation high enough, and a voice loud enough, I would cry out to all the valetudinarians upon earth, 'Drink tar-water.'

12 Having thus frankly owned the charge, I must explain to you that by a panacea is not meant a medicine which cures all individuals (this consists not with mortality), but a medicine that cures or relieves all different species of distempers. And if God hath given us so great a blessing, and made a medicine so cheap and plenty as tar to be withal so universal in its effects, to ease the miseries of human life, shall men be ridiculed or bantered out of its use, especially when they run no risk in the trial? For I can truly affirm that I never knew any harm attend it, more than sometimes a little nausea, which, if the liquor be well cleared, skimmed and bottled, need not, I think, be apprehended.

13 It must be owned I have not had opportunities of trying it myself in all cases; neither will I undertake to demonstrate

l 1 (*This section not in A, B*). *l* 2 *and* (*not in C, D*). *l* 9 *in*—(*C, D, E*) *here in.* *l* 19 *direct*—(*C*) *plain and direct.* *l* 35 *For . . . apprehended* (*not in A, B*).

a priori that tar-water is a panacea. But yet methinks I am not quite destitute of probable reasons, which, joined to what facts I have observed, induced me to entertain such a suspicion.

14 I knew tar was used to preserve cattle from contagion; and this may be supposed to have given rise to that practice of drinking tar-water for a preservative against the small-pox. But as the tar-water used for that purpose was made by mixing equal quantities of tar and water, it proved a most offensive potion: besides, as a fresh glass of water was put in for each glass that was taken out, and this for many days on the same tar, it followed that the water was not equally impregnated with the fine volatile spirit, though all alike strongly saturated with gross particles.

15 [1] Having found this nauseous draught very useful against the small-pox to as many as could be prevailed on to take it, I began to consider the nature of tar. I reflected that tar is a balsam flowing from the trunks of aged evergreens; that it resists putrefaction; that it hath the virtues of turpentine, which in medicine are known to be very great and manifold; but I observed withal that turpentines or balsams are very offensive in the taking. I therefore considered distinctly the several constituent parts of balsams—which were those wherein the medicinal virtues resided, and which were to be regarded rather as a viscous matrix to receive, arrest, and retain the more volatile and active particles, and, if these last could be so separated and disengaged from the grosser parts as to impregnate a clear and potable liquor, I concluded that such liquor must prove a medicine of great force and general use. I considered that nature was the best chemist and preparer of medicines, and that the fragrance and flavour of tar argued very active qualities and virtues.

16 I had of a long time entertained an opinion agreeable to the sentiments of many ancient philosophers, *that fire may be regarded as the animal spirit of this visible world.*[2] And it seemed to me that the attracting and secreting of this fire in the various pores, tubes, and ducts of vegetables, did impart their specific virtues to each kind; that this same light or fire was the immediate instrumental or physical cause of sense and motion, and

l 4 *knew*—(*A*, *B*) *know*. *l* 10 *followed*—(*C*, *D*) *follows*.

[1] [This section condenses *Siris*, Sects. 7-71.—Ed.] [2] [See my Introduction to *Siris*, p. 10. Fire as the ultimate physical instrument of God is the subject of *Siris*, Sects. 152-219. For the meaning of 'instrumental or physical cause' see *ibid.*, Sects. 154 and 161.—Ed.]

consequently of life and health to animals; that, on account of this solar light or fire, Phœbus was in the ancient mythology reputed the god of medicine. Which light, as it is leisurely introduced and fixed in the viscid juice of old firs and pines, so the setting it free in part, that is, the changing its viscid for a volatile vehicle, which may mix with water, and convey it throughout the habit[1] copiously and inoffensively, would be of infinite use in physic, extending to all cases whatsoever, inasmuch as all distempers are in effect a struggle between the *vis vitæ* and the peculiar miasma or *fomes morbi;* and nothing strengthens nature, or lends such aid and vigour to life, as a cordial which doth not heat.

17 The solar light, in great quantity during the space of many successive years, being attracted and detained in the juice of ancient evergreens, doth form and lodge itself in an oil so fine and volatile as shall mix well with water, and lightly pass the *primæ viæ*, and penetrate every part and capillary of the organical system, when once exempt and freed from the grosser nauseous resin. It will not, therefore, seem unreasonable to whoever is acquainted with the medicinal virtues of turpentine in so many different distempers, for which it hath been celebrated both by ancient and modern physicians, and withal reflects on the nausea or clog that prevents their full operation and effect on the human body; it will not, I say, seem unreasonable to such a one to suppose that, if this same clog were removed, numberless cures might be wrought in a great variety of cases.

18 The *desideratum* was, how to separate the active particles from the heavy viscid substance which served to attract and retain them; and so to order matters that the vehicle of the spirit should not on the one hand be volatile enough to escape, nor on the other gross enough to offend. For the performing of this, I have found a most easy, simple, and effectual method, which furnished a potable inoffensive liquor, clear and fine as the best white wine, cordial and stomachic, to be kept bottled, as being endued with a very sensible spirit, though not fermented.

19 I tried many experiments as to the quantity of water, and the time of stirring and standing, in order to impregnate and clarify it, and after all, fixed on the forementioned receipt as the most generally useful for making this salutiferous liquor well

l 33 *furnished—(A to E) furnisheth.*

[1] [The human body.—Ed.]

impregnated, and not offensive to common stomachs, and even drank with pleasure by many; in which the most medicinal and active particles, that is, the native salts and volatile oil of the balsam, being disentangled and separated from its gross oil and viscous resin, do, combined together, form a fine balsamic and vegetable soap, which not only can pass the stomach and *primæ viæ*, but also insinuate itself into the minutest capillaries, and freely pervade the whole animal system, and that in such full proportion and measure as suiteth every case and constitution.

20 The foregoing general considerations put me upon making experiments in many various and unlike cases, which otherwise I should never have thought of doing, and the success answered my hopes. Philosophical[1] principles led me to make safe trials, and on those trials is founded my opinion of the salutary virtues of tar-water; which virtues are recommended from, and depend on, experiments and matters of fact, and neither stand nor fall with any theories or speculative principles whatever. Howbeit, those theories, as I said, enlarged my views of this medicine, led me to a greater variety of trials, and thereby engendered and nourished my suspicion that it is a panacea. I have been the more prolix in these particulars, hoping that, to as many as shall candidly weigh and consider them, the high opinion I conceive of this medicine will not seem altogether an effect of vain prepossession, or blind empiric rashness, but rather the result of free thought and inquiry, and grounded on my best reason, judgment, and experience.

21 Those who have only the good of mankind at heart will give this medicine fair play; if there be any who act from other motives, the public will look sharp and beware. To do justice to tar-water, as well as to those who drink it, regard must be had to the particular strength and case of the patients. Grievous or inveterate maladies must not be treated as common cases. I cured a horrible case, a gangrene in the blood, which had

l 3 *that is*—(*B*) *that is to say.* *l* 3 *salts and*—(*B*) *salts, spirit and.* *l* 3 *of the balsam* (*not in B*). *l* 4 *and separated* (*not in B*). *l* 4 *its*—(*B*) *the.* *l* 5 *do . . . not only* (*not in B*). *l* 6 *pass*—(*B*) *freely pass.* *l* 6 *stomach and* (*not in B*). *l* 7 *but also* (*not in B*). *l* 7 *itself . . . capillaries*—(*B*) *themselves into the smallest ducts.* *l* 8 *freely* (*not in B*). *l* 8 *system*—(*B*) *machine.* *l* 26 (*C, D, E add*) *Much complaint is indeed made of the iniquity of the times: however, it is hoped they will not condemn one man's tar-water for another's pills or drop, any more than they would hang one man for another's having stole a horse.*

[1] [In the old sense, *i.e.*, 'scientific.'—Ed.]

broke out in several sores and threatened speedy death, by obliging the person to drink nothing but this liquor for several weeks, as much and as often as his stomach would bear. Common sense will direct a proportionable conduct in the other cases. But this must be left to the conscience and discretion of the givers and takers.

22 After all that can be said, it is most certain that a panacea sounds odd, and conveys somewhat shocking to the ear and sense of most men, who are wont to rank the universal medicine with the philosopher's stone and the squaring of the circle; whereof the chief if not sole reason I take to be, that it is thought incredible the same thing should produce contrary effects, as it must do if it cures opposite distempers. And yet this is no more then every day's experience verifies. Milk, for instance, makes some costive and others laxative. This regards the possibility of a panacea in general; as for tar-water in particular, I do not say it is a panacea, I only suspect it to be so; time and trial will shew.

23 But I am most sincerely persuaded, from what I have already seen and tried, that tar-water may be drank with great safety and success for the cure or relief of most if not all diseases —of ulcers, itch, scald-heads, leprosy, King's evil, cancers, the foul disease, and all foul cases, scurvies of all kinds, disorders of the lungs, stomach, and bowels, in rheumatic, gouty and nephritic ailments, megrims, inveterate headaches, epilepsies, pleurisies, peripneumonies, erysipelas, small-pox, and all kinds of fevers, colics, hysteric and all nervous cases, obstructions, dropsies, decays, and other maladies. Note that for agues it should be drank warm and often, in small glasses, both in and out of the fit, and continued for several days to prevent a relapse. Nor is it of use only in the cure of sickness; it is also useful to preserve health, and guard against infection; and in some measure even against old age, as it gives lasting spirits, and invigorates the blood. I am even induced, by the nature and analogy of things, and its wonderful success in fevers of all kinds, to think that tar-water may be very useful against the plague, both as a preservative and a cure.

l 4 *the other—(A to E) other.* *l* 22 *King's evil, cancers (not in A to E).* *l* 24 *in rheumatic (not in B).* *l* 25 *megrims, inveterate headaches (not in B); inveterate headaches (not in A).* *l* 25 *epilepsies (not in A to Fi).* *l* 26 *small-pox (not in A, B).* *l* 27 *colics (not in A, B).* *l* 27 *obstructions (not in A to Fi).* *l* 28 *Note that . . . relapse (not in A to D).* *l* 36 *very (not in B).*

24 But I doubt no medicine can withstand that execrable plague of distilled spirits, which do all, without exception (there being a caustic and coagulating quality in all distilled spirits, whatever the subject or ingredients may be), operate as a slow poison, preying on the vitals, and wasting the health and strength of body and soul; which pest of human kind is, I am told, gaining ground in this country, already too thin of inhabitants.[1]

I am, etc.

l 2 *there being—(A to E) the fire of the hot still imparting.* *l* 3 *in—(A to E) to.*

[1] [See *Siris*, Sect. 107 and note there.—Ed.]

A SECOND LETTER TO THOMAS PRIOR

1 YOUR attention to whatever promotes the public good of your country, or the common benefit of mankind, having engaged you in a particular inquiry concerning the virtues and effects of tar-water, you are entitled to know what farther discoveries, observations, and reflections I have made on that subject.

2 Tar-water, in the several editions of *Siris*, hath been directed to be made by stirring three, four, five, or six minutes, for a gallon of water and a quart of tar. But, although it seem best made, for general use, within those limits, yet the stomach of the patient is the best rule whereby to direct the strength of the water. With a little more stirring, six quarts of good tar-water may be made from one of tar; and with eight minutes' stirring I have known a gallon of tar-water produced from second-hand tar, which proved a good remedy in a very bad fever, when better tar could not be had. For the use of travellers, a tar-water may be made very strong, for instance, with one quart of water and a quart of tar, stirred together for the space of twenty minutes. A bottle of this may serve long on a road, a little being put to each glass of common water, more or less, as you would have it stronger or weaker. Near two years ago, a quart of about this strength was given to an old woman, to be taken at one draught by direction of a young lady, who had consulted one in my family about the method of preparing and giving tar-water, which yet she happened to mistake. But even thus, it did service in the main, though it wrought the patient violently all manner of ways; which shews that errors and excesses in tar-water are not so dangerous as in other medicines.

3 The best tar I take to be that which is most liquid, or first running from the billets of fir or pine which grew on the mountains. It hath a greater share of those antiscorbutic vegetable juices, which are contained not only in the leaves and tender tops, but in all parts of the wood; and these, together with the salts of wood-soot, being in the composition of tar superadded to turpentine, render tar-water a medicine, if I am not

l 21 *Near two years . . . medicines* (*not in A, B*).

mistaken, much more extensive and efficacious than any that can be obtained from turpentine alone.

4 The virtues of the wood-juices shew themselves in spruce-beer, made of molasses and the black spruce-fir in the northern parts of America; and the young shoots of our common spruce-fir have been put to malt liquor in my own family, and make a very wholesome drink.

5 Tar-water seldom fails to cure, or relieve, when rightly made of good tar, and duly taken. I say, of good tar, because the vile practice of adulterating tar, or of selling the dregs of tar, or used tar for fresh, is grown frequent, to the great wrong of those who take it. Whoever hath been used to good tar-water can readily discern the bad by its flat taste, void of that warm cordial quality found in the former; it may also be expedient, for knowing fresh tar, to observe whether a fat oily scum floats on the top of the water, which is found to be much less, if any at all, on the second making of tar-water. This scum was directed to be taken off, not from its being apt to do harm when drank, but to render the tar-water more palatable to nice stomachs. Great quantities of tar are produced in Germany, Italy, and other parts of the world. The different qualities or virtues of these it may be worth while to try, and I wish the trial were made principally by observing which giveth most sense of a lively cordial spirit upon drinking the water.

6 This medicine of tar-water worketh various ways, by urine, by perspiration, as a sudorific, carminative, cardiac, astringent, detergent, restorative, alterative, and sometimes as a gentle purgative or emetic, according to the case or constitution of the patient, or to the quantity that is taken; and its operation should not be disturbed. I knew two brothers ill of a fever about the same time; it wrought on the one by copious sweating, on the other altogether by urine; and I have known it to act at different times differently even on the same person, and in the same disorder, one while as a diaphoretic, or sudorific, another as a diuretic. Its general character is diuretic, which shews that it cleanseth the urinary passages, preventing thereby both stone and gravel, against which it hath been found very useful, and much safer than mineral waters, by reason of its balsamic healing quality.

7 Tar-water doth recover and impart vital heat, but imparts no inflaming heat. I have seen a wonderful cure wrought on a

l 1 *much* (*not in A*). *l* 40 *impart*—(*A*) *communicate.*

child about eight years old, and past all hopes, by pouring several spoonfuls of tar-water down his throat, as he lay quite subdued by a most violent fever, without any appearance of sense or motion, the nostrils drawn back, the eyes fixed, the complexion deadly wan. And yet tar-water, forced down by spoonfuls, seemed to kindle up life anew; and this after sage-tea, saffron, milk-water, Venice treacle, etc., had been used without any success.

8 This is of itself a sufficient cordial, friendly and congenial to the vital heat and spirits of a man. If, therefore, strong liquors are in the accustomed quantity superadded, the blood being already, by tar-water, sufficiently warmed for vital heat, the strong liquors superadded will be apt to overheat it, which overheating is not to be imputed to the tar-water, since, taken alone, I could never observe it attended with that symptom.

9 And, though it may be no easy matter to persuade such as have long indulged themselves in the free use of strong fermented liquors and distilled spirits to forsake their pernicious habits, yet I am myself thoroughly persuaded that, in weakness or fatigue of body, or in low spirits, tar-water alone doth far surpass all those vulgarly esteemed cordials which heat and intoxicate, and which coagulate the fluids, and, by their caustic force, dry up, stiffen, and destroy the fine vessels and fibres of the unhappy drinkers, obstructing the secretions, impairing the animal functions, producing various disorders, and bringing on the untimely symptoms of old age. Nothing doth so much obstruct the good effects of tar-water as the abuse of strong liquors. Where this is avoided, it seems no chronical malady can keep its ground or stand before tar-water, constantly and regularly taken, not even hereditary distempers, as the most inveterate king's evil, nor even the most confirmed gout; provided it be drank a quart a day, at six or eight glasses, and at all seasons, both in and out of the fit, and that for a great length of time, the longer the better. It is to be noted that in fits of the gout, colic, or fever, it should be always drank warm; on other occasions, warm or cold, as the patient likes.

10 The inference I make is, that those who expect health from tar-water have less need of any other cordial, and would do well to sacrifice some part of their pleasure to their health. At the same time, I will venture to affirm that a fever produced either from hard drinking, or any other cause, is most effectually and speedily subdued by abstaining from all other cordials, and plentifully drinking of tar-water, for it warms the cold, and cools

the hot. Simple water may cool, but this, at the same time that it cools, gives life and spirit. It is, in truth, a specific for all kinds of fevers; the same medicine, which is a leisurely alterative in chronical disorders, being taken in larger quantities is a speedy cure in acute ones.

11 Those who, without knowledge or experience of tar-water, have been so active and earnest to discredit its virtues, have much to answer for, especially with regard to acute inflammatory distempers, in which it doth wonders. It is in those disorders, so fatal and frequent, that I have had most opportunities of observing its virtues; nor can the world ever know the just value of this medicine but by trying it in the like cases.

12 When patients are given over, and all known methods fail, it is allowed to try new remedies. If tar-water was tried in such cases, I do verily believe that many patients might thereby be rescued from the jaws of death; particularly, I would recommend the trial of it in the most malignant and desperate fevers, or small-pox, attended with purple, livid, or black spots. It is my sincere opinion that warm tar-water, drank copiously, may often prove salutary even in those deplorable cases.

13 My opinion is grounded on its singular virtues in correcting, sweetening, and invigorating the blood, and in curing cancers and gangrenes, or beginning mortifications, such as those spots do indicate. I have lately known it drunk with good success in a very painful and unpromising wound; and am persuaded that if it were drank plentifully during the dressing of all sorts of dangerous wounds, it might assuage the anguish, and forward the cure, as it abates feverish symptoms, and, by rendering the blood balsamic and disposing the parts to heal, prevents a gangrene.

14 Tar itself is an excellent medicine, being spread on a cloth, and applied warm to an ulcer or wound. I have known the same applied to a very large and painful tumour, caused by a sprain or bruise, speedily assuage the pain, and reduce the swelling. I may add that tar (mixed with honey to make it less offensive, and) taken inwardly, is an admirable balsam for the lungs; and a little of this, taken together with tar-water, hastens its effect in curing the most obstinate and wasting coughs; and an egg-shell full of tar, swallowed and washed down with a quart of tar-water, night and morning, hath been found very useful for the same disorder in horses.

l 3 *the same . . . acute ones* (*not in A*).

15 Sitting over the vapour of the heated lotion, described in my former letter, is excellent in the case of piles or fistula; especially if fomenting with the said lotion be added, as also anointing with the oil scummed from the top of tar-water. Tar-water hath been snuffed up the nostrils, with good success, for a great heaviness of the head and drowsiness. It is a very useful wash for weak, dry, or itching eyes; an excellent preservative for the teeth and gums; also a good drink and gargle for a sore throat. I may add that I have known it succeed in cases where it has been tried without hopes of success, particularly in deafness. I have known life sustained many days together only by drinking of tar-water, without any other nourishment, and without any remarkable diminution of strength or spirits; it may therefore be of singular use, and save many lives in the distress of famine at sea, or in sieges, and in seasons of great scarcity. The virtue of tar-water, flowing like the Nile [1] from a secret and occult source,[2] brancheth into innumerable channels, conveying health and relief wherever it is applied; nor is it more easy and various in its use than copious in quantity. How great havoc, nevertheless, is made by the small-pox, raging like a plague in New England and other parts of America, which yet abound with tar! And how many thousand sailors, in all parts of the world, are rotting by the scurvy with their remedy at hand!

16 Many in this town of Cloyne have, by the copious drinking of tar-water alone, been recovered of the most violent fevers, attended with the most threatening symptoms, and much heightened by relapses from mismanagement. It would be tedious to enumerate all the cases of this kind which have happened at Cloyne and in my own family, where many fevers, pleuritic as well as others, attended with violent stitches, difficulty of breathing, and spitting of blood, have been cured by tar-water: and this I can with truth affirm, that I never knew it regularly tried in any inflammatory case without success: but then it must be given in bed, warm and very copiously, with all due caution against cold, noise, and improper diet.

l 11 *deafness*—(*A*) *stammering and.* *l* 18 *nor is it . . . at hand* (*not in A*). *l* 30 *attended . . . blood* (*not in A*).

[1] The Nile was by the ancient Egyptians called *Siris*, which word also signifies in Greek, a chain, though not so commonly used as *Sira*.

[2] [The old riddle of the Nile's source was not involved until the nineteenth century, but in 1669 Sir Peter Wyche had published in his *Relation of the River Nile* the accounts of two Portuguese priests who had found (one in 1615, the other in 1625) the sources of the Blue Nile.—Ed.]

17 I have often observed, when a patient, on the first attack of a fever, hath betaken himself to his bed, and drank tar-water regularly and constantly, that he hath had such favourable symptoms, so good appetite, and so sound sleep, that the fever passed almost as nothing, nor was to be distinguished otherwise than by a quickness of pulse, a little feverish heat, and thirst. The more that patients in a fever drink, the better they find themselves; and their liking to tar-water grows with their want of it, by a certain instinct or dictate of nature; insomuch that I have known children in very high fevers who at other times could hardly be prevailed on to drink a single glass, drink six or eight in an hour.

18 I can truly affirm that, for the cases within my own observation, inflammatory acute distempers cured by tar-water have been at least ten times the number of any other. These indeed oftenest occur, as causing the chief destruction and general ravage of mankind, who are consequently debarred from the principal use and benefit of this medicine, so long as they give ear to the suggestions of those who, without any experience thereof, would persuade them it is of a heating or inflaming nature[1]; which suggestion, as I am convinced myself, by long and manifold experience, that it is absolutely false, so may all others also be sufficiently convinced of its falsehood by the wonderful fact, attested by a solemn affidavit[2] of Captain Drape at Liverpool; whereby it appears that of 170 negroes seized at once by the small-pox on the coast of Guinea one only died, who refused to drink tar-water, and the remaining 169 all recovered, by drinking it, without any other medicine, notwithstanding the heat of the climate, and the incommodities of the vessel. A fact so well vouched must, with all unbiassed men, outweigh the positive assertions of those who have declared themselves adversaries of tar-water, on the score of its pretended heating or inflaming quality.

19 The skill and learning of those gentlemen in their profession I shall not dispute; but yet it seems strange that they should,

l 1 *I have*—(*A*) *It gives such spirits that I have known persons in a fever pass several days without any other aliment, and yet all the while in such a flow of spirits as hardly to be kept in bed. And I have.* *l* 33 *or* (*not in A*). *l* 35 *seems*—(*A*) *seemed.*

[1] [See note on *Siris*, Sect. 7.—Ed.] [2] [Berkeley here gives a reference to Sections 42–44 of Prior's *Authentic Narrative* (to which this Letter was appended), in which the affidavit is given in full. I give the text at the end of this Letter, on p. 189.—Ed.]

without experience, pronounce at once concerning the virtues of tar-water, and ascribe to it pernicious qualities which I, who had watched its workings and effects for years together, could never discover. These three last years I have taken it myself without one day's intermission; others in my family have taken it near the same time, and those of different ages and sexes; several in the neighbourhood have done as much, all without any injury, and much benefit.

20 It is to be noted, the skin and the belly are antagonists; that is, the more passeth by perspiration, the less will pass another way. Medicines, therefore, which cause the patient to perspire will be apt to make him costive. Therefore, when tar-water worketh much by perspiration, the body may chance to be bound. But such symptom, though it should be attended with a little more than ordinary warmth, need not be dreaded by the patient, it being only a sign that his cure is carried on by driving the peccant matter through the skin, which is one of the ways whereby tar-water worketh its effect. And when this effect or cure is wrought, the body of itself returneth to its former natural state; and if some have been bound in their bodies, I have known others affected in a contrary manner upon drinking tar-water, as it hath happened to operate either in the shape of a diaphoretic, or of a gentle opening medicine. I have even known a costive habit more than once removed by it, and that when the case was inveterate, and other methods had failed.

21 I mentioned the foregoing article upon calling to mind that two or three patients had, for a time, complained of a binding quality in tar-water. I likewise remember that one in a high degree of the scurvy was discouraged from the use of tar-water by its having caused an uneasy itching all over his body. But this was a good symptom, which shewed the peccant humours to be put in motion, and in a fair way of being discharged through the skin.

22 A humour or flatus put in motion and dislodged from one part often produceth new pains in some other part; and an efficacious medicine, as it produceth a change in the economy, may be attended with some uneasiness, which yet is not to be accounted a distemper, but only an effect or symptom of the cure.

23 The salts of tar-water have nothing of the fiery and corrosive nature of lixivial salts [1] produced by the incineration of the

l 4 *three*—(*A*) *two.*

[1] [See note on *Siris*, Sect. 8.—Ed.]

subject; they not being fixed salts, made by the extreme force of fire, but volatile salts, such as pre-existed in the vegetable, and would have ascended in smoke if not prevented by the sods or covering of the billet piles.[1] This, though already hinted in *Siris*, and plain from the manner of making tar, I have thought fit to repeat and inculcate because, if duly attended to, it may obviate suspicions about tar-water proceeding only from an ignorance of its nature.

24 Every step that I advanced in discovering the virtues of tar-water, my own wonder and surprise increased, as much as theirs to whom I mentioned them. Nor could I, without great variety and evidence of facts, ever have been induced to suspect that in all sorts of ailments whatsoever it might relieve or cure, which at first sight may seem incredible and unaccountable, but, on maturer thought, will perhaps appear to agree with, and follow from, the nature of things. For it is to be noted that the general notion of a disease seemeth to consist in this, that what is taken in is not duly assimilated by the force of the aimal economy; therefore it should seem whatever assists the *vis vitæ* may be of general use in all diseases, enabling nature either to assimilate or discharge all unsubdued humours or particles whatsoever. But the light or æther detained in the volatile oil which impregnates tar-water, being of the same nature with the animal spirit, is an accession of so much strength to the constitution, which it assists to assimilate or expel whatever is alien or noxious.

[1] [See *Siris*, Sect. 13.—Ed.]

CAPTAIN DRAPE'S AFFIDAVIT [1]

THE *Little Foster* of Liverpool (Captain Drape, Master), in the year 1742 made a voyage to Guinea, and having taken in 216 negroes. Before he left the coast he had the misfortune to see the small-pox break out amongst them. In a very short time there were no less than one hundred and seventy ill of that distemper all at once.

The Captain was under great concern, and fully expected that for want of room and other necessaries he must infallibly lose the greatest part of them. A person on board advised the Master to infuse a quantity of tar in water and give it the slaves to drink, saying it was practiced in the same case with good success. The tar-water was prepared, but the first to whom it was offered obstinately refused it, and so did many more. That man died in two or three days, which the rest seeing were more easily brought to compliance, so that partly by persuasion partly by force, the rest were all brought to drink. The good effects followed soon after, and were so plainly perceived by the poor creatures themselves that they came upon deck and, crowding about a tub of tar-water that was set there for them, drank plentifully of it from time to time of their own accord.

This has an effect that could hardly be expected under the most commodious circumstances; for of those one hundred and seventy (most of them grown persons) not one died except that one man that could not be brought to drink the tar-water. Captain Drape says farther that the negroes continued drinking tar-water after their recovery, which they found so much relief from that they could hardly be brought to drink any other ; and that from the time of their departure from Guinea to their arrival in Jamaica he verily believes they did not drink above a hogshead of water that was not impregnated with tar, though the ordinary consumption of water for so many slaves could not be less than a hogshead a day.

I do hereby certify upon oath that the contents of the above narrative are actually and *bona fide* true.

Liverpool, the 14th of January 1744. JOSEPH DRAPE.

Taken and sworn before me, Owen Prichard, Mayor of Liverpool.

[1] [Referred to above, p. 186, l. 24 and *n.* 2.—Ed.]

A [THIRD] LETTER TO THOMAS PRIOR

They provoked Him to anger with their own inventions,
and the plague brake in upon them.—Ps. cvi. 29.

You observe, in a late letter of yours, that I had formerly hinted tar-water might be useful in the plague [1]; and desire to know the reasons whereon my opinion was grounded, and that I would communicate my thoughts at large on the subject. I am the more willing to satisfy you in this particular, as the plague now raging in Barbary hath in some measure alarmed the public, and I think it may not be amiss to contribute my mite of advice towards averting or lessening the present danger; and, as fear begets caution, to possess my countrymen with an apprehension of this, the greatest of all temporal calamities, sufficient to put them on their guard, and prepare them against the worst that can happen.

A learned physician of our own observes that the plague does not visit these Britannic islands oftener than once in thirty or forty years, and it is now above twice that time since we felt the hand of the destroying angel.

It is also the opinion of physicians that the infection cannot spread except there is a suitable disposition in the air to receive it; the signs of which are wet summers, leaves and fruits blasted, an unusual quantity of insects, epidemical distempers among the cattle, to which I presume may be added long easterly winds—all which signs seem to have discovered themselves pretty plainly in the course of this present year.

Besides these natural forerunners of a plague or pestilence in the air, it is worth observing that a prognostic may be also made from the moral and religious disposition of the inhabitants. Certainly that the *digitus Dei* (the τὸ θεῖον of Hippocrates [2]) doth manifest itself in the plague was not only the opinion of

[1] [In the first Letter, Sect. 23. *ad fin.*, and in *Siris*, Sect. 83. The Bubonic Plague is meant, an infectious fever, in one of its varieties marked by glandular swellings (buboes) and carbuncles. As an epidemic it last occurred in England in 1665. In 1738-45 it was rampant in Eastern Europe, and in 1743 in Messina.—Ed.] [2] [*Prognosticon*, 1, εἴ τι θεῖον ἔνεστι ἐν τῇσι νούσοισι.—Ed.]

mankind in general, but also in particular of the most eminent physicians throughout all ages down to our own. How far we of these islands have reason to expect this messenger of divine vengeance will best appear if we take a view of the prevailing principles and practices of our times, which many think have long called aloud for punishment or amendment.

Analogy and probability prevail in medicine; these are the proper guides where experience hath not gone before. I knew that tar-water was useful to prevent catching the small-pox,[1] and consequently that its nature was contrary to the taint or venom producing that distemper; and therefore I concluded that it might be usefully applied to cure the same, though I never heard nor knew that it had been applied to that purpose, and the success answered my hopes.

In like manner, having known the virtue of tar-water in preserving from epidemical infection, I conceive in general it may be useful for the cure of distempers caused by such infection. Besides, being very well assured that tar-water was sovereign in the cure of all sorts of fevers, I think it not unreasonable to infer that it may prove a successful medicine for the plague, although I have never known it used in that distemper, forasmuch as the plague with all its symptoms may be considered as a species of fever, and hath been actually considered as such both by Hippocrates[2] and Sydenham,[3] not to mention others.

Having observed surprising effects of tar-water in the most deplorable cases, for instance, pleurisies, small-pox, spotted and erysipelatous fevers, I am induced to entertain great hopes of its success in pestilential fevers or plagues; which are also confirmed by its operating as a powerful diaphoretic and sudorific, when given warm and in great quantities. Add to this, that it frequently throws out pustules and ulcers, is apt to terminate the worst of fevers by an eruption of boils in various parts of the body; that it raises the spirits, is a great alexipharmacum[4] and cordial, and must therefore be of the greatest use in malignant cases.

In cachexy,[5] scurvy, gout, as well as in the close of fevers, I have often known tar-water cause troublesome eruptions or boils (the very method taken by nature in casting forth the venom of

[1] [*Siris*, Sect. 2.—Ed.] [2] [*Epidemiae*, III, Sect. iii.—Ed.]
[3] [*Observationes Medicae* (1666, London), SECT. II, c. 2. Cp. note on *Siris*, Sect. 80.—Ed.] [4] [Antidote against poison.—Ed.] [5] [See *Siris*, Sect. 93.—Ed.]

the plague) to break out in the surface of the body, expelling the morbific humours, the cause and relics of the disease, to the signal benefit of the patients; except such who, being frightened at the symptoms, have supposed the tar-water to produce those humours which it only drives out, and, in consequence of such their groundless suspicion, laid it aside, or perhaps took other medicines to hinder its effect, and thereby deprived themselves of the benefit they might otherwise have received.

In the plague are observed headache, drowsiness, anxiety, vigils, sinking of spirits, and weakness, for all which tar-water hath been found an effectual remedy. Bloody urine and spitting blood, which are also dangerous symptoms observed in the plague, have been often removed by the same medicine, which from numberless experiments I have found to be peculiarly fitted for purifying and strengthening the blood, and for giving it a due consistence, as well as a proper motion.

In the plague, pleurisies are esteemed mortal symptoms, and in the cure of these I never knew tar-water fail, if given warm in bed, a pint or more an hour, though the patient was neither bled nor blistered. The carbuncles and spots which shew themselves in the plague are of a gangrenous nature, tending to mortification. And gangrenes I have known effectually cured by copious drinking of tar-water.

An erysipelas, which sheweth a degree of malignity nearest to the plague, is easily cured by plentiful drinking of tar-water. I knew a person who had been six weeks ill of an erysipelas under the care of a celebrated physician, during which time she struggled with many dangerous symptoms, and hardly escaped with life. This person was a year after seized again in the same manner, and recovered in a week, by the sole use of tar-water. Costiveness is reckoned a very hopeful prognostic in the plague; and it is also a symptom which often attends the drinking of tar-water, when it throws out the venom of a distemper through the skin.

Diseases of the same season generally bear some affinity to each other in their nature and their cure; and it may not be improper on this occasion to observe that the reigning distemper of the black cattle hath been often cured by tar-water, and would (I am persuaded) have done much less mischief if the practice had been general to have given each distempered beast three gallons the first, two the second, and one the third day, in warm doses (from a pint to a quart), and at equal intervals.

Diemerbroeck[1] recommends in the first appearance of a plague the use of sudorifics, putting the patient to bed, and covering him warm, till a copious sweat be raised, the very method I constantly follow in the beginning of fevers, using no other medicine than tar-water, which, after numberless experiments, I take to be the best sudorific that is known, inasmuch as it throws out the morbific miasma, without either heating the patient or weakening him, the common effect of other sudorifics, whereas this, at the same time that it allays the feverish heat, proves a most salutary cordial, giving great and lasting spirits.

Upon the whole, I am sincerely persuaded that for the cure of the plague there cannot be a better method followed, more general for use, more easy in practice, and more sure in effect, than to cover the patient warm in bed, and to make him drink every hour one quart of warm tar-water, of such strength as his stomach is able to bear; a thing not so impracticable as it may seem at first sight, since I have known much more drank in fevers, even by children, and that eagerly and by choice, the distemper calling for drink, and the ease it gave encouraging to go on. This for the cure; but I conceive that one quart *per diem* may suffice for prevention, especially if there be added an even temper of mind, and an exact regimen, which are both highly useful against the plague. For carbuncles and buboes I would recommend a liniment of the oil of tar, or a plaster of pitch mixed with tar, which last was used by the vulgar in the Dutch plague described by Diemerbroeck.

It has pleased divine Providence to visit us not long since, first with famine, then with the sword[2]; and if it shall please the same good Providence yet further to visit us for our sins with the third and greatest of human woes, this, by God's blessing, is the course I mean to take for myself and family; and if generally practised, it would, I doubt not (under God), save the lives of many thousands; whereof being persuaded in my own mind, both from the many trials I have made of tar-water, and the best judgment and reasonings I could form thereupon, I think myself obliged to declare to the world what I am convinced of myself.

[1] [Isbrand de Diemerbroeck (1600-74), a well-known Dutch physician. The reference may be directly to his *De Peste* (1646) or to *A Treatise concerning the Pestilence, abridged and translated by Thomas Stanton* (1722, London), pp. 18 f. The Dutch plague was in 1636-37.—Ed.] [2] [A famine began in Ireland in 1739 (see note on *Siris*, Sect. 77). The 'sword' would be the Jacobite rebellion of 1745-46.—Ed.]

And I am the rather moved to this by the great uncertainty and disagreement among physicians, in their methods of treating the plague. Diemerbroeck, for instance, a physician of great experience in the Dutch plague that raged about eighty years ago, dissuades by all means from bleeding in that distemper. On the other hand, Sydenham recommends what the other disapproves. If we believe Dr. Sydenham,[1] the free use of wine, as a preservative, hath thrown many into the plague who otherwise might have escaped. Dr. Willis,[2] on the contrary, avers that he knew many who, being well fortified by wine, freely entered amongst the infected without catching the infection.

Bleeding cools, but at the same time weakens nature. Wine gives spirits, but heats withal. They are both, therefore, to be suspected; whereas tar-water cools without weakening, and gives spirit without heating, a sure indication of its sovereign virtue in all inflammatory and malignant cases; which is confirmed by such numbers of instances that matter of fact keeps pace (at least) with reason and argument in recommending this medicine.

Plagues as well as fevers are observed to be of different kinds: and it is observed of fevers that, as they change their genius in different seasons, so they must be treated differently, that very method that succeeded in one season often proving hurtful in another. Now it is very remarkable that tar-water has been known to vary its working, and wonderfully adapt itself to the particular case of the patient, a thing I frequently have experienced.

Last spring two children, a boy and a girl, the former ten years old, the latter eight years old, were seized with fevers; the boy had an inflammation in his breast. In less than two hours they drank each about five quarts of warm tar-water, which wrought them very differently, the girl as an emetic, the boy as a gentle purge, but both alike immediately recovered, without the use of any other medicine: of this I was an eye-witness, and I have found by frequent experience that the best way is to let this medicine take its own course, not hindered nor interrupted by any other medicines; and, this being observed, I never knew it to fail so much as once, in above a hundred trials in all sorts of fevers.

[1] [*Loc. cit.*—Ed.] [2] [*De Febribus*, c. 13 (*Opera Omnia*, 1682, Amst., p. 108). On Willis see note on *Siris*, Sect. 205. In his *Plain and easy Method for preserving . . . from the Plague* (1691; written in 1666), pp. 7 and 26 f. he recommends the moderate use of wine as one preservative.—Ed.]

Nevertheless, there are not wanting those who would insinuate that tar-water made in the common way contains noxious oils or particles of tar, which render it dangerous to those who drink it, a thing contrary to all my experience. This was the old objection made by those who opposed it from the beginning. But I am convinced, by innumerable trials, that tar-water is so far from doing hurt by any caustic or fiery quality that it is, on the contrary, a most potent medicine for the allaying of heat and curing of all inflammatory distempers. The perpetually returning to the same objection makes it necessary to repeat the same answer.[1]

And yet some who are not afraid to argue against experience would still persuade us that the common tar-water is a dangerous medicine, and that the acid freed from the volatile oil is much more safe and efficacious[2]: but I am of opinion that, being robbed of its fine volatile oil (which neither sinks to the bottom, nor floats at the top, but is throughout and intimately united with it, and appears to the eye only in the colour of tar-water); being robbed, I say, of this oil, it is my opinion it can be no cordial; which opinion (not to mention the reason of the thing) I ground on my own experience, having observed that the most acid water is the least cordial—so far am I from imputing the whole virtue to the acid, as some seem to think.

It seems not very reasonable to suppose that the caustic quality of tar-water (if such there was) should be removed or lessened by distillation, or that a still should furnish a cooler and better medicine than that which is commonly prepared by the simple affusion and stirring of cold water.[3] However the ends of chemists or distillers may be served thereby, yet it by no means seemeth calculated for the benefit of mankind in general to attempt to make people suspect, and frighten them from the use of, a medicine so easily and so readily made, and everywhere at hand, of such approved and known safety, and, at the same time, recommended by cures the most extraordinary on persons of all sexes and ages, in such variety of distempers, and in so many distant parts of Christendom.

By most men, I believe, it will be judged, at best, a needless undertaking, instead of an easy-tried medicine to introduce one

[1] [See note on *Siris*, Sect. 7.—Ed.] [2] [So Andrew Reid, *A letter to the Rev. Dr. Hales, concerning the Nature of Tar, and a method of obtaining its medical Virtues from its hurtful Oils* (1747, London). This was replied to by D. W. Linden in the writing mentioned below, p. 219. Cp. *Siris*, Sect. 60.—Ed.] [3] [See note on *Siris*, Sect. 120.—Ed.]

more operose and expensive, unsupported by experiments, and recommended by wrong suppositions—that all the virtue is in the acid, and that the tar-water, being impregnated with volatile oil, is caustic, which are both notorious mistakes.

Though it be the character of resin not to dissolve and mix with water as salts do, yet these attract some fine particles of essential oil, which serves as a vehicle for such acid salts; and the colour of the tar-water sheweth the fine oil, in which the vegetable salts are lodged, to be dissolved and mixed therein. The combination of two such different substances as oil and salt constitutes a very subtle and active medicine, fitted to mix with all humours, and resolve all obstructions, and which may properly be called an acid soap.

Tar-water operates more gently and safely, as the acid salts are sheathed in oil, and, thereby losing their acrimony, approach the nature of neutral salts, and so become more friendly to the animal system. By the help of a smooth insinuating oil, these acid salts are more easily and safely introduced into the fine capillaries. I may add, that the crasis of the blood is perfected by tar-water, being good against too great a solution and fluidity as a balsam, and against viscidity as a soap, all which entirely depends upon the mixture of oil with the acid, without which it could neither operate as a balsam nor a soap. Briefly, it was not mere acid or distilled water, or tincture of tar, but tar-water, as commonly made, by affusion and stirring of cold water upon tar, which hath wrought all those great cures and salutary effects which have recommended it as a medicine to the general esteem of the world.

The mixture of volatile oil, which is or contains the spirit, is so far from noxious that it is the very thing that makes tar-water a cordial; this gives it a grateful warmth, and raiseth the spirits of the hysteric and hypochondriacal; this also, rendering the blood balsamic, disposeth wounds of all sorts to an easy cure; this also it is that fortifies the vitals, and invigorates nature, driving the gout to the extremities and shortening the fits, till it entirely subdues that obstinate and cruel enemy, as it hath been often known to do; but acid alone is so far from being able to do this that, on the contrary, the free use of acids is reckoned amongst the causes of the gout.

I never could find that the volatile oil drawn from tar by the affusion of cold water produced any inflammation, or was otherwise hurtful, not even though the water by longer stirring had

imbibed far more of the oil than in the common manner, having been assured that some of strong stomachs have drank it after twenty minutes' stirring, without any the least harm, and with very great benefit.

It hath been indeed insinuated that the oil was ordered to be skimmed off because it is caustic and dangerous; but this is a mistake. I myself, among many others, drank the tar-water for two years together, with its oil upon it; which never proved hurtful, otherwise than, as being somewhat gross, and floating on the top, it rendered the water less palatable, for which reason alone it was ordered to be skimmed.

It hath also been hinted that making tar-water the second time of the same tar was cautioned against for that it was apprehended such water would prove too heating; which is so far from being true that, when I could not get fresh tar, I used the second water without difficulty, by means whereof it pleased God to recover from the small-pox two children in my own family, who drank it very copiously, a sufficient proof that it is not of that fiery caustic nature which some would persuade us.

The truth is, my sole reason for advising the tar not to be used a second time was, because I did not think it would sufficiently impregnate the water, or render it strong enough, after so much of the fine volatile parts had been carried off by the former infusion. Truth obligeth me to affirm that there is no danger (for as much as I could ever observe) to be apprehended from tar-water, as commonly made; the fine volatile oil, on which I take its cordial quality to depend, is, in its own nature, so soft and gentle, and so tempered by the acid, and both so blended and diluted with so great a quantity of water, as to make a compound, cherishing and cordial, producing a genial kindly warmth without any inflaming heat, a thing I have often said, and still find it necessary to inculcate.

Some medicines indeed are so violent that the least excess is dangerous; these require an exactness in the dose, where a small error may produce a great mischief. But tar is, in truth, no such dangerous medicine, not even in substance; as I have more than once known it taken innocently, mixed with honey, for a speedy cure of a cold.

But, notwithstanding all that hath been said on that subject, it is still sometimes asked, What precise quantity or degree of strength is required? To which I answer (agreeably to what hath been formerly and frequently observed), the palate, the

stomach, the particular case and constitution of the patient, the very climate or season of the year, will dispose and require him to drink more or less in quantity, stronger or weaker in degree. Precisely to measure its strength, by a scrupulous exactness, is by no means necessary. Every one may settle that matter for himself, with the same safety that malt is proportioned to water in making beer, and by the same rule, to wit, the palate.

Only in general thus much may be said, that the proportions I formerly recommended will be found agreeable to most stomachs, and withal of sufficient strength, as many thousands have found, and daily find, by experience. I take this opportunity to observe that I use tar-water made in stone ware or earthen very well glazed,[1] earthen vessels unglazed being apt to communicate a nauseous sweetness to the water.

Tar-water is a diet-drink, in the making whereof there is great latitude, its perfection not consisting in a point, but varying with the constitution and palate of the patient, being, nevertheless, at times, taken by the same person weaker or stronger with much the same effect, provided it be proportionably in greater or lesser quantity. It may indeed be so very weak as to have little or no effect; and, on the other hand, so very strong as to offend the stomach; but its degree of strength is easily discerned by the colour, smell, and taste, which alone are the natural and proper guides whereby to judge thereof: which strength may be easily varied, in any proportion, by changing the quantity either of tar or water, or the time of stirring. As for setting tar-water to stand, this is not to make it stronger, but more clear and palatable.

I found myself obliged to assert the innocence and safety, as well as usefulness, of the tar-water as it is commonly made by the methods laid down in my former writings on this subject; and this was not only in regard to truth, but much more in charity to a multitude, which may otherwise perhaps be influenced by the authority of some who endeavour to put them out of conceit with a medicine so cheap, so efficacious, and so universal, by suggesting and propagating scruples about a caustic quality arising from the volatile oily particles of tar or resin imbibed together with the acid in making tar-water; an apprehension so vain that the reverse thereof is true, for which I appeal to the experience of many thousands, who can answer for the innocence and safety, as well as efficacy, of this medicine, of which there

[1] [See p. 171*n*.—Ed.]

are such ample and numerous certificates published to the world.

I shall finish my essay on the plague and its cure with observing that, in case God should withold His hand for the present, yet these reflections will not be altogether fruitless if they dispose men to a proper temper of mind, and a cautious regimen, avoiding all extremes (which things are justly reckoned among the chief preservatives against infection), but especially if the apprehension of this destroyer shall beget serious thoughts on the frailty of human life, and, in consequence thereof, a reformation of manners; advantages that would sufficiently repay the trouble of writing and reading this letter, even though the trial of tar-water, as a remedy for the plague, should be postponed (as God grant it may) to some future and distant opportunity.

A Letter to the Reverend Dr. Hales

on the Benefit of Tar-water in Fevers,
for Cattle as well as the Human Species

The Text

A LETTER
TO
THE REVEREND DR. HALES[1]

To one gallon of fresh tar, pour six gallons of cold water; stir and work them strongly together, with a large flat stick, for the space of one full hour; let the whole stand six or eight hours, that the tar may subside; then scum it, and pour off the water, whereof three gallons warm are to be given the first day, two the second, and one the third day, at equal intervals, the dose not being less than a pint, not more than a quart; and the beast being all that time, and for two or three days after, kept warm and nourished, if it will not eat hay, with mash or gruel.

I believe this course will rarely fail of success, having often observed fevers in human kind to have been cured by a similar method. But as in fevers it often throws out pustules or ulcers on the surface of the body, so in beasts it may be presumed to do the like; which ulcers, being anointed with a little tar, will, I doubt not, in a short time dry up and disappear.

[1] [Published Oct. 1747 in London, in *Two Letters from the Right Reverend Dr. George Berkeley . . . to Thomas Prior . . . to the Rev. Dr. Hales.* It had already appeared, dated 17 Jan., in the *Gentleman's Magazine* (London) for Feb., 1747, VOL. XVII, pp. 64f. It was not reprinted again until 1871, when Fraser included it in his edition of Berkeley's *Works.*

On the use of tar-water for cattle, see pp. 176, 192, and 214f.

The Rev. Stephen Hales, D.D. (1677–1761), a friend of Pope, whose will he witnessed, was distinguished both as inventor and as physiologist. He was elected a Fellow of the Royal Society in 1718. His *Vegetable Statics* (1727) is counted the chief work on plant-physiology in the century, making him the solitary successor of Nehemiah Grew (see *Siris,* Sect. 30); and his *Statical Essays* (1733; referred to in *Siris,* Sect. 196) is held to be the best contribution to animal physiology after Harvey. In both fields of physiology he introduced the methods of measurement. On his life and work see *Stephen Hales,* by A. E. Clark-Kennedy, 1929, Cambridge.

Berkeley addressed his letter to him presumably because of his *Account of some Experiments and Observations on Tar-Water* (1745, London; 2nd ed., 1747), a paper read before the Royal Society, and perhaps the only responsible pamphlet which Berkeley's writings on the subject had evoked.—Ed.]

By this means the lives of infected cattle may be preserved at the expense of a gallon of tar for each. A thing which I repeat and inculcate, not only for the sake of the cattle and their owners, but also for the benefit of mankind in general, with regard to a fever; which terrible subduer and destroyer of our species, I have constantly found to be itself easily subdued by tar-water. Nevertheless, though in most other cases I find that the use of this medicine hath generally obtained, yet in this most dangerous and frequent case, where its aid is most wanted, and at the same time most sure, I do not find that the use thereof has equally obtained abroad in the world.

It grieves me to think that so many thousands of our species should daily perish by a distemper which may be easily cured by a remedy so ready at hand, so easy to take, and so cheap to purchase as tar-water, which I never knew to fail when copiously drank in any sort of fever. All this I say after more than a hundred trials, in my own family and neighbourhood.

But, whatever backwardness people may have to try experiments on themselves or their friends, yet it is hoped they may venture to try them on their cattle, and that the success of such trials in fevers of brutes (for a fever it plainly is) may dispose them to probable hopes of the same success in their own species.

Experiments, I grant, ought to be made with caution, and yet they may be made, and actually are made every day on probable reasons and analogy. Thus, for instance, because I knew that tar-water was cordial and diaphoretic, and yet no inflamer, I ventured to give it in every stage of the small-pox, though I had never heard of its being given otherwise than as a preservative against that distemper; and the success answered my expectation.

If I can but introduce the general use of tar-water for this murrain, which is in truth a fever, I flatter myself this may pave the way for its general use in all fevers whatsoever.

A murrain among cattle hath been sometimes observed to be the forerunner of the plague among men. If that should prove the present case (which God forbid) I would earnestly recommend the copious drinking of warm tar-water, from the very first appearance of the symptoms of such plague. I do also recommend it to be tried in like manner against the bite of a mad dog, when other approved medicines are not at hand.

Farther Thoughts on Tar-water

The Text

FARTHER THOUGHTS ON TAR-WATER[1]

As the many experiments that are daily made of the virtues of tar-water furnish new discoveries and reflections, some of these I have thrown together, and offer to the public in hopes they may prove useful.

It is a frequent complaint that tar-water is made of bad tar, being of a reddish colour, sweetish, or disagreeably insipid. But, though the dregs of tar are often foul, and make foul tar-water, and though the tar already used is often made use of by unfair dealers a second, if not a third time, which produceth a vile potion, void of the genuine flavour and virtue of tar-water; yet I apprehend these defects may sometimes be ascribed rather to the vessel wherein the tar-water is made than to the tar itself.

Tar-water being made in an earthen vessel unglazed, or that hath lost part of its glazing, may extract (as it is a strong menstruum) from the clay a fade sweetishness, offensive to the palate.[2] It should seem, therefore, that the best way of making tar-water is in a stone jug, or earthen vessel, throughout well glazed; and, as it will not fail to extract a tincture from any metallic vessel, it should be warmed in a well-glazed pipkin, rather than a sauce-pan.

By increasing the proportion of tar to the water, and by stirring it longer, tar-water may be made strong enough for a spoonful to impregnate a large glass, a thing very useful on a road.

Those who in chronical disorders, or as a preservative, have for a long time drunk tar-water, must in acute cases drink the more.

Tar-water must be drunk warm in agues, small-pox, measles and fevers, in colic and disorders of the bowels, in gout also, and rheumatism; in most other ailments cold or warm, at the choice of the patient.

In fevers the patient cannot begin too soon, or drink too much. By undoubted experience it is found to cool the hot,

[1] [This is Berkeley's last writing. It was published only in his *Miscellany* (Nov. 1752), two months before his death.—Ed.] [2] [See note above, p. 171.—Ed.]

and warm the cold, and to be a most successful medicine in fevers, notwithstanding its great virtue in palsies and dropsies.

When not long since an inflammation attacked the throat, breast, and lungs of children, and became general in my neighbourhood, numbers were recovered by the use of tar-water; nor did I hear that any miscarried who used it, though many perished who did not.

Nor is it a medicine less proper and efficacious in old age. At the same time that this inflammatory distemper raged among the children, a woman in her sixty-eighth year, from violent cold, was seized at once with ague, colic, and jaundice, of all which maladies she was cured in a fortnight by drinking three pints of warm tar-water every day. Numberless such instances daily occur, which shew it to be a safe and efficacious medicine for old and young.

Evacuations by sweat, which usually render patients very weak and dispirited, have not the same bad effects when produced by tar-water, which I have frequently known to give high spirits in all the stages of a fever, and under the lowest regimen; therefore old people and weak persons, who cannot well bear common evacuations, are best cured by tar-water, which in some sort seemeth to renew those who are worn out with age and infirmities.

Tar-water is of singular use in strengthening the stomach and bowels, and agrees particularly well with infants, taken either by themselves or by the nurse, and best by both; though, as it throws the ill humours out into the surface of the skin, it may render them for a time, perhaps, unseemly with eruptions, but withal healthy and lively. And I will venture to say that it lays in them the principles of good constitution for the rest of their lives.

Nor is it only useful to the bodies of infants; it hath also a good effect on their minds, as those who drink it are observed to be remarkably forward and sprightly. Even the most heavy, lumpish, and unpromising infants appear to be much improved by it. A child there is in my neighbourhood, of fine parts, who at first seemed stupid and an idiot, but, by constant use of tar-water, grew lively and observing, and is now noted for understanding beyond others of the same age.

Infants are easily brought to take it by spoon, and even grow to a liking of it; and, as their disorders arise chiefly from indigestion, they receive the greatest benefit from a medicine so

well calculated to strengthen the intestines, and preserve them from fits. In a word, if it were the common practice to accustom infants from the beginning to take tar-water, this would greatly conduce to the health both of their minds and bodies. There is, I am verily persuaded, no one thing in the power of art or nature that would so generally and effectually contribute to repair the constitutions of our gentry and nobility, by strengthening the children, and casting off in their infancy those impurities and taints which they often bring into the world.

An infant may take one quarter of a pint in the day, warm, by spoonfuls; less may do good, and there is no fear of excess. When I consider the private woe of families, as well as the public loss, occasioned by the death of such an incredible number of infants under two years of age, I cannot but insist on recommending tar-water, both as a remedy and preservative in that tender age, which cannot bear the common treatment and methods of physic, or with safety take those drugs which are fitter for grown persons.

Another reason which recommends tar-water, particularly to infants and children, is the great security it brings against the small-pox to those that drink it, who are observed either never to take that distemper, or to have it in the gentlest manner.

There is no distemper more contagious and destructive than the small-pox, or more generally dreaded, attended with worse symptoms, or that leaves behind it worse effects. I observe, at the same time, that tar-water is in no other case a more safe and sure remedy than in this; of which Captain Drape's certificate,[1] sworn to before the Mayor of Liverpool, in the presence of several principal persons of that town, is a most evident proof.

That one hundred and seventy persons, seized at once with the small-pox, deprived of all conveniences, and in the worst circumstances of a narrow ship and hot climate, should all recover by the single medicine of tar-water, except one who would not drink it, is a matter of fact so plain and convincing, and so well attested, as to leave no doubt, in minds free from prepossession, about the usefulness and efficacy of tar-water in the small-pox, a point I had been before sufficiently convinced of, by many instances in my own neighbourhood.

It hath been surmised by some celebrated physicians that one day a specific may be discovered for the peculiar venom of the small-pox. There seems to be some reason for thinking that

[1] [See above, p. 186.—Ed.]

tar-water is such a specific. I say this on good grounds, having by many experiments observed its virtue in curing, as well as in preventing, that cruel distemper; during the whole course of which, it is to be drank warm; a moderate glass (about half a pint) every hour, in common cases, may suffice; in bad cases more may be given; there is no fear of excess.

Those who endeavour to discredit this cooling, cordial, and salutary medicine, as an inflamer of the blood, do very consistently decry its use in the small-pox; but there can be nothing more clear, full, and satisfactory than Captain Drape's affidavit, to convince reasonable people of the great and surprising efficacy of tar-water in the cure of the small-pox; and consequently of the groundlessness of that report which ascribes a heating or inflaming quality to it.[1] And yet that groundless report hath hindered many from reaping the benefit they might otherwise have done from the use of this water, which is of excellent virtue in all kinds of inflammatory disorders, fevers, quinsies, pleurisies, and suchlike, of the hot and inflamed kind, whereof the public as well as myself have known a multitude of examples.

I ask whether the fact sworn before the magistrates of Liverpool be not a sufficient answer to all that is objected, from an inflaming quality, to tar-water? Can any instance be produced in the whole *materia medica*, or history of physic, of the virtue of a medicine tried on greater numbers, or under greater disadvantages, or with greater success, or more credibly attested? I wish, for the common good of mankind, that the same experiment was tried in our hospitals. Probably the world would soon be relieved from that great and general terror of the small-pox.

When I hear of the devastations made by this distemper in great cities and populous towns, how many lives are lost, or (as may be said) thrown away, which might have been in all likelihood easily preserved, by the use of a medicine so cheap and obvious, and in every one's power, it seems matter of great concern and astonishment, and leaves one at a loss to guess at the motives that govern human actions in affairs of the greatest moment. The experiment may be easily made if an equal number of poor patients in the small-pox were put into two hospitals at the same time of the year, and provided with the same necessaries of diet and lodging; and, for further care, let the one have a tub of tar-water and an old woman, the other hospital, what attendance and drugs you please.

[1] [See note on *Siris*, Sect. 7.—Ed.]

In all obstinate sores and ulcers, I very much recommend the drinking of tar-water; and washing them with a strong lotion of it will hasten the cure.

One of the most painful and dangerous cases is that of a woman's sore breast. How many poor creatures, after long languishing in misery, are obliged to suffer the most severe chirurgical operations, often the cutting off the entire breast? The use of tar-water in those cases hath been attended with such success that I do earnestly recommend the drinking thereof, both as a cure and preservative, as a most effectual medicine to remove the shooting pains that precede a cancer, and also to cure the cancer itself, without amputation. Cancerous and sore breasts are such cruel cases, occasioned by so many internal causes, as well as outward accidents, that it is a necessary piece of humanity to contribute all we can to the prevention and cure thereof.

In the king's evil,[1] leprosy, and foulest cases, tar-water cannot be too much recommended. The poor vagabonds of Ireland are many of them infected and eaten up with the foul disease, which with them passeth for a canker, as they call it. Several instances of extraordinary cures have been performed on such persons, by drinking tar-water copiously, for some weeks or months together, without confinement or other restraint than that of a regular cool diet. It is indeed a specific both for this and all other taints and impurities of the blood.

An extract of *Siris* was made, and accounts of the effects of tar-water were reprinted in America,[2] in which continent, as well as in the islands, much use hath been made thereof, particularly by those who possess great numbers of slaves. Of this I have been informed by letters, and by word of mouth, from persons belonging to those parts, who have assured me of the extensive and successful use of this medicine in many cases, and more especially in the most inveterate kinds of the foul disease.

I need not say how dearly they purchase health who obtain it by salivation[3] and yet, long and severe as that course is, it is often unsuccessful. There are instances of such as having passed through it with much misery and patience have been afterwards cured by the simple use of tar-water.

[1] [Scrofula.—Ed.] [2] [Of this I cannot give particulars. Berkeley refers to it in two letters, one of 23 Aug. 1749 to Johnson, and one of 22 Nov. 1751 to Archdall.—Ed.] [3] [See note on *Siris*, Sect. 4.—Ed.]

The king's evil, so loathsome in its symptoms and effects, and withal so difficult if at all possible to cure by any other method, is most surely and easily cured by the tar-water, even when the patient is far gone, even when he derives it from his ancestors. A quart *per diem* for a few months, I have known to cure the most deplorable and abandoned cases.

How many wealthy families, otherwise at their ease, are corrupted with this taint in their blood! How many want heirs and husbands through this odious malady! A specific for this disease alone would be justly esteemed a most valuable secret, and the plenty and cheapness of the medicine ought not in reason to make it less esteemed.

Salivating, bleeding, and purging are attended with great hardships and inconveniences (even where the patient recovers), reducing the strength and spirits of those who use them, whereas tar-water greatly adds to both.

In fractures and wounds, a quart or two drank daily while the patient is under cure doth very much assuage the pain and promote his recovery, both as by its balsamic nature it disposeth the parts to heal, and also as it lessens, if not totally prevents, the fever.

A poor boy in Cloyne, having fallen from a tree, broke both arm and wrist. This accident was concealed or neglected for two or three weeks; he was then put under the care of a skilful bone-setter, who, finding the bones knit and grown crooked, and that it would be necessary to break them again in order to set them right, and withal considering the hot season of the year (in July), he apprehended his patient's being thrown into a fever that might prove fatal. But the boy being made to drink copiously of tar-water, this prevented or lessened the fever in such sort that the bones were broke and set again, and the cure proceeded as easily and speedily as could be wished.

I have known several instances of bruises and wounds cured by tar-water. A person in my neighbourhood ran over by a horse was much bruised, and cured only by drinking tar-water. Another knocked down with a mallet, thereupon thrown into a violent fever and given for dead, another wounded with an axe so that his life was thought in danger, were both recovered by the use of tar-water; which, as it is sovereign against gangrenes and fevers, hath great success in all sorts of wounds, contusions, and fractures, being taken throughout the whole chirurgical process, along with whatsoever other methods or remedies are applied.

Tar-water operates variously. In dropsies and bruises it hath been known to work by purging. The stronger kind being used as a wash is good against ulcerous eruptions. But, in all cases where the lotion is used, I believe the drinking of tar-water might alone suffice, albeit the sores may be longer withering and drying away.

There is a certain age or time of life when the female sex runs no small risk from the ceasing of their natural evacuations. In this case tar-water is a good preservative, purifying the blood, and clearing it from that cancerous tendency which it is sometimes subject to about that time. I take it to be a specific in all cancerous cases; even the bleeding cancer, esteemed incurable by physicians, hath been cured by tar-water.

In diseases peculiar to women it is of no small use. Several who had suffered much by accidents in child-bearing have found themselves relieved by tar-water. In all sorts of tumours, wens, and preternatural excrescences, it hath been found an excellent remedy.

Many dangerous symptoms, and even sudden death, are often owing to a polypus in some or other of the vessels through which the blood circulates, than which it seems there is no inward cause of death or disease more to be dreaded and guarded against. How many drop down dead in our streets, or at table, or in the midst of business, or diversions! How many are found dead in their beds!

Tremors, palpitations of the heart, irregular pulses, apoplexies, sudden deaths, often proceed from a slow, stagnating, interrupted motion or stoppage of the blood in its circulation through the body; and there seemeth to be no cause so certainly productive of obstructed circulation as the polypus, a case, perhaps, much more frequent than is commonly imagined. Morgagni,[1] the celebrated professor at Padua, and most eminent anatomist, who was supposed to have dissected more human bodies than any man living, assured me, above thirty years ago, that in the far greater part of such bodies he found polypuses, if not in the ventricles of the heart or larger vessels, yet in some other vessel or cavity; to which he attributes many disorders,

[1] [1682-1771. Professor of Anatomy at Padua from 1711, and regarded as the virtual founder of pathological anatomy. Berkeley could have met Morgagni on either of his two tours on the Continent (1713-14, 1716-20): there is no record of his having visited Padua, but he might have passed that way in 1718 or 1719 (see the end of his letter to Percival, 13 Nov. 1718).—Ed.]

and which he supposed to be formed by the obstructed motion of the blood. To prevent this, he dissuaded from all tight ligatures, especially in sleep, unbuttoning the neck and wristbands of his shirt every night, a practice he had learned (as he said) from his master the famous Malpighi.[1]

When the circulation is once quite stopped nothing can restore it, which would be the same thing as restoring a dead man to life; and in proportion as the circulation of the blood is obstructed, the body is disordered. Total obstruction is death; partial obstruction is disease. The polypus therefore is always hurtful, if not mortal. It is, indeed, matter of serious reflection, that we may probably carry about with us a principle of death, always at work within, and of a nature so violent and sudden in its effects, so hard to come at, and so difficult to subdue.

It may well be thought, at first view, a vain undertaking to attempt to dissolve a fleshy or membranous substance, so latent and inaccessible, by common means or medicines. But, as tar-water hath been undoubtedly known to dissolve and disperse wens, and other fleshy or membranous tumours, in the outward parts of the body,[2] having been drank and circulated with the blood, it should seem, by a parity of reason, that it may also dissolve and put an end to those concretions that are formed on the ventricles of the heart or blood vessels, and so remove one great cause of apoplexies and sudden death: and what cures may prevent. I have been the longer on this subject for the sake of many who lead sickly lives, as well as several who are snatched away by untimely death.

Universally, in all cases where other methods fail, I could wish this of tar-water was tried. It hath been sometimes known that the most inveterate headaches, and other nervous disorders, that would yield to no other medicine, have been cured by a course of tar-water regularly and constantly pursued.

Wheresoever pure blood or plenty of spirits are wanting, it may be concluded from manifold experience that tar-water is of singular benefit. Several persons have acknowledged themselves to be much fitter to go through business or study from the use of it.

Nor is it only medicinal to human kind: it is also of no small use in the curing of brute animals. It hath been tried on several

[1] [1628-94. The founder of microscopic anatomy.—Ed.] [2] See 'The Effects of Tar-water,' Sects. 228, 229. [*I.e.*, Thos. Prior's *Authentic Narrative of the Success of Tar-water* (1746).—Ed.]

kinds, particularly with great success in the late epidemical distemper of our horses. And I have been credibly informed that, being drank in plenty, it hath recovered even a glandered horse that was thought incurable.

And as it is of such extensive use both to man and beast, it should seem that a tub of tar-water constantly supplied in a market town, would serve, in some sort, for a hospital. Many other drugs are not easily got, this is everywhere plenty and cheap; many are of a doubtful nature, this of known innocence; others soon perish, this lasts for years, and it is not the worse for keeping. This, in short, is a medicine for the common people, being a safe and cheap remedy for such as cannot afford to be long sick, or to make use of costly medicines.

A patient who drinks tar-water must not be alarmed at pustules or eruptions in the skin; these are good symptoms, and shew the impurities of the blood to be cast out. It is also not amiss to observe that, as tar-water, by its active qualities, doth stir the humours, entering the minutest capillaries and dislodging obstructions, it may happen that this working shall sometimes be felt in the limbs, or discharge itself in a fit of the gout, which, however disagreeable, proves salutary.

I am credibly informed of several strange conveyances which tar-water hath found out, whereby to discharge impurities from the human constitution. A person who had been in a bad state of health above twenty years, upon a course of tar-water was thrown into a most extraordinary fit of an ague, and from that time recovered a good state of health. An old gentleman in the county of Cork, who for a long time had been a valetudinarian, afflicted with many infirmities, being advised to drink tar-water, found himself relieved; but it produced and soon cured a phthiriasis or lousy distemper, in which the putrid humours having discharged themselves left him quite sound and healthy.

In a course of tar-water, if any disorder happens from some other cause, as from cold, from the use of strong liquors, from a surfeit, or suchlike accident, it would not be fair to impute it to tar-water: and yet this hath been sometimes done.

The effects of vomiting occasioned by tar-water are not to be apprehended. Some are discouraged from drinking because their stomachs cannot bear it. But, when it takes a turn towards working upwards, nature, by that very way, hath been often known to carry on the cure. A worthy gentleman, member of Parliament, came into my neighbourhood in the autumn of the

year 1750: he was cachectic and extremely reduced, so that his friends thought him near his end. Upon his entering into a course of tar-water, it produced a prodigious vomiting, which weakened him much for the present; but, persisting to continue the use thereof for about two months, he was restored to his health, strength, and spirits.

Tar-water is very diuretic, thereby preventing stone and gravel, and carrying off by urine those salts that might otherwise occasion fevers, rheumatisms, dropsies, headaches, and many other disorders, if retained in the blood. Hence some have apprehended a diabetes from the continued use thereof, but it is so far from causing a diabetes that it hath been known to cure that disorder.

The constitution of a patient sometimes requireth, during a course of tar-water, that he take water and honey, also roasted apples, stewed prunes, and other diet of an opening kind. A hint of this is sufficient. If the reader now and then meets with some remarks contained in my former writings on this subject, he may be pleased to consider I had rather repeat than forget what I think useful to be known.

Some, endeavouring to discourage the use of tar-water in England, have given out that it may indeed be serviceable in Ireland, where people live on such low diet as sour milk and potatoes, but it cannot be of the same service in England, where men are accustomed to a more liberal and hearty food; and indeed it must be owned that the peasants in this island live but poorly, but no people in Europe live better (in the sense of eating and drinking) than our gentry and citizens, and from these the instances of cures by tar-water have been chiefly taken. Those who would confine its use to the moist air and poor diet of Ireland may be assured that all over Europe, in France, and Germany, Italy, Portugal, and Holland, tar-water works the same effects. In both North and South, in West and East Indies, it hath been used and continues to be used with great success. It hath reached all our Colonies both on the Continent and the Islands, and many barrels of tar-water have been sent from Amsterdam to Batavia; of all which I have had authentic accounts. But its use is nowhere more conspicuous than at sea, in curing that plague of seafaring persons, the scurvy, as was found in the late attempt to discover a north-west passage [1]; and

[1] [An Act of 1745 had offered a reward of £20,000 for the discovery, by a British ship, of the North-West Passage.—Ed.]

(as I doubt not) will be found as oft as it is tried. Every ship in His Majesty's navy should always have a vessel of tar-water upon deck for the use of the sailors, both in the scurvy and other maladies.

It is indeed a medicine equally calculated for all climates, for sea and land, for rich and poor, high and low livers; being, as hath been elsewhere mentioned, a cordial which doth not heat; a peculiar privilege this, and of excellent use. That it is a cordial is manifest from its cheering and enlivening quality; and that it is not heating is as manifest from its singular use in all cases where the blood is inflamed. As this medicine imparts a friendly genial warmth, suited to the human constitution, those who pass through a course of tar-water would do well not to increase such friendly warmth to an inflaming heat by a wrong regimen of high-seasoned food and strong liquors, which are not wanted by the drinkers of tar-water. There is a certain degree of heat necessary to the well-being and life of man. More than this will be uneasy, and this uneasiness indicates a proper choice of diet.

I have myself drank above a gallon of tar-water in a few hours, and been cooled and recovered from a fever by it. So many instances of the same nature I have known as would make it evident, to any unprejudiced person, that tar-water is a cooling medicine; of which truth I am as thoroughly convinced as it is possible to be of any theorem in physic or natural science.

The unsuccessfulness of other methods should rather be an encouragement than a bar to the trial of tar-water. A young lady, daughter to a worthy gentleman near Cork, had been long afflicted with a grievous pain in her side, and, having had the best advice that could be got, was not relieved until she drank tar-water, which quite removed her pain. Some time after she was again seized with the same disorder, but, returning to the use of tar-water, she grew well, and still continues so.

A woman turned out of the infirmary at Cork as incurable, because she would not submit to the cutting off her leg, came to Cloyne, where she continued half a year drinking tar-water, and living upon bread and milk, by which course she recovered and went to service.

[1] There is at present, while I am writing, a most remarkable case here at Cloyne, of a poor soldier in a dropsy, whose belly

[1] [This paragraph was printed in the *Gentleman's Magazine* (London), VOL. XXIV (1754), p. 434, as a letter from Berkeley to Faulkner, the publisher of the Dublin edition of his *Miscellany*.—Ed.]

was swollen to a most immoderate size. He said he had been five months in a hospital at Dublin, and, having tried other methods in vain, left it, to avoid being tapped. It is a fortnight since he came to Cloyne, during which time he hath drunk two quarts of tar-water every day. His belly is now quite reduced; his appetite and sleep which were gone are restored; he gathers strength every moment; and he who was despaired of seems to be quite out of danger, both to himself and to all who see him. It is remarkable that, upon drinking the tar-water, he voided several worms of a very extraordinary size. This medicine, which is observed to make some persons costive, is to hydropic patients a strong purge. The present is but one of several instances wherein the dropsy hath been cured by tar-water, which I never knew to fail in any species of that malady.

I am very credibly informed that an aged clergyman of Maidstone in Kent, being reduced to the last extremity by the gout in his stomach, after having tried strong liquors and the methods usual in that case without success, betook himself to drink a vast quantity of warm tar-water, still replenishing and letting it take its course; by which it pleased God to deliver him from the jaws of death.

A gentleman in the county of Clare, near Ennis, had a fever and pleurisy, and inflammation of the lungs; being at the last extremity, and given over by two physicians, he was advised to drink tar-water, which he did, eight quarts. Next morning one of the doctors, asking at what hour his patient died, to his great surprise found he was recovered. This I had from a Parliament man, his neighbour.

When the yellow fever (as it was called) raged in the West Indies, the negroes, with a tub of tar-water in their quarters, did well: but some of the better sort miscarried, among whom the physician himself lay at the point of death; but his brother recovered him by pouring down his throat in spoonfuls some of the same liquor that recovered the negroes. The fact was related to me by a gentleman who was then in the island of St. Christopher's, and knew it to be true.

A physician himself not long since assured me he had cured an ulcer in the bladder by ordering his patient to drink tar-water, when he had tried all other methods in vain, and thought the case incurable.

But it would be endless to relate the effects of tar-water in desperate cases. The recovery of Mrs. Wilson, daughter to the late

Bishop of London, from a lingering hopeless disorder, was a noted case, and attested to by his Lordship. I have even been informed, upon good authority, of two or three instances wherein persons have been recovered by tar-water after they had rattles in the throat.

In certain cases, a smaller quantity of tar-water hath proved ineffectual, when a larger hath perfected the cure. A woman of Cloyne got cold after child-bearing, which occasioned a great pain in her thigh, swelling also and redness; she continued in great torment above three weeks. She then began to drink tar-water, but not drinking much, she did not perceive much good; and when there was not any hopes of her life, she was persuaded to try what a gallon a day might do; upon this she grew better, the swelling broke and ran; no dressing was used but tar, and no washing but tar-water, until she was quite recovered.

In ailments of an odd and untried nature, it may be worth while to try tar-water. In proof of this many instances might be given. A gentleman with a withered arm had it restored by drinking tar-water. Another who, by running his head against a post, had a concussion of the brain attended with very bad symptoms, recovered by drinking tar-water after other medicines had failed. In my own neighbourhood, one had lost the use of his limbs by poison, another had been bitten by a mad ass; these persons drank tar-water, and their cure was attributed to it.

When tar-water is copiously drank in fevers, the great danger to be guarded against is an excessive flow of spirits, which excites the patient to talk and divert himself with company, which may produce a relapse; of this I have known fatal effects.

If in a course of tar-water the patient should find himself heated, let him abstain from or lessen his dose of spirituous and fermented liquors; for tar-water alone never heats.

In chronical disorders it is not advisable to break off a course of tar-water at once, but rather to diminish the quantity by degrees.

The acid alone hath not the medical virtues of tar-water. This is agreeable to reason and experience, as well as the opinion of the ablest judges. Doctor Linden justly observes, 'that when the empyreumatic oil is entirely separated from the acid, it is not in any shape superior to any other distilled acids or vinegars whatsoever' (*Treatise on Selter Water*, p. 307).[1]

[1] [*A Treatise on the Origin, Nature, and Virtues of Chalybeat Waters . . . to which is added an Appendix on the Selter Water* (1748, London), p. 307. On Linden, see above, p. ix; he wrote several pieces on the spa-waters of England and Wales. —Ed.]

That [1] extraordinary virtues should be contained in tar-water will not seem strange if we consider that pitch is nothing else but hardened tar, or tar drained of its moisture; and that an extraordinary quantity of light is retained in the substance of pitch,[2] as appears from certain electrical experiments, which, having been made since, seem not a little to confirm what had before been suggested in *Siris*.

[1] Something of this nature hath been long expected and hoped for, if we may credit that learned chemist Doctor Linden. 'At last (saith he) the long delayed wishes of the most eminent men of the Faculty are fulfilled in the Bishop of Cloyne's discovery.' See *Treatise on Selter Water*, p. 303. Again (speaking of the empyreumatic oils of plants) he hath these words—'There has always prevailed a notion among the chemists, and particularly with Paracelsus and his followers, that in those oils there lay a great secret undiscovered. This notion was occasioned by the strange effects which a small quantity thereof hath upon the human machine. Several have been very diligent to discover this secret, and to find out a method to administer these oils with safety. Yet nothing was performed salutary until the Bishop of Cloyne discovered to us the tar-water; to him alone we are indebted for rendering the empyreumatic oils a safe medicine in every respect.'—*Ibid.* p. 302. [2] [See *Siris*, Sects. 43-5, 212, 217. What the 'electrical experiments' were I am unable to say.—Ed.]

Varia

EDITOR'S INTRODUCTION

THESE trifles are included for the sake of completeness. Berkeley would not have wished the verses to be preserved. That he could versify better is shewn by his well-known little poem on America (see VOL. VIII of this edition).

The first piece was enclosed with a letter to Prior dated 19 June 1744 (preserved by Berkeley's grandson, G. Monck Berkeley, in his *Literary Relics*, 1789, London, p. 283), with the request that it be printed 'in the public papers' without the author's name. So far as I can trace, Prior printed it only in his own *Authentic Narrative of the Success of Tar-water* (1746; p. 27 of London ed.). 'It is all the answer,' Berkeley tells Prior, 'that I intend for Dr. Jurin's letter, for that, I am told, is the writer's name of a pamphlet addressed to me.' This anonymous pamphlet was entitled *A letter to the Right Reverend the Bishop of Cloyne, occasion'd by his Lordship's Treatise on the Virtues of Tar-water* (June 1744, London, 39 pp.). Dr. James Jurin (1684-1750), who became President of the Royal College of Physicians in the year of his death, had defended the mathematicians against the criticisms in Berkeley's *Analyst* (1734); see VOL. IV of this edition.

The second piece is to be found in some copies only of *Siris*, 'second edition,' Dublin 1744. It was first reprinted in 1933 by Dr. Luce in *Proceedings of the Royal Irish Academy* (vol. xli, Sec. C, p. 159).

The third piece was sent to Prior on 5 Sept. 1744 with a letter (also preserved by Monck Berkeley *op. cit.*, p. 286) asking him to have it printed anonymously 'in a newspaper or the *Gentleman's Magazine*.' It appeared in the latter (Oct., vol. 14, p. 559), and was reprinted in Prior's *Authentic Narrative* (p. 28 of the 1746 London edn.).

The open letter in the *Dublin Journal* adds nothing new. A further letter, 'To T. P. Esq.,' appeared in the issue of May 26-9 of this journal, and was also inserted behind the title-page of some copies of *Siris*, 'new ed.,' 1744, London. Since it is merely an abstract of the first *Letter to Prior*, I have not reproduced it.

ON THE DISPUTES ABOUT TAR-WATER

To drink or not to drink ! that is the doubt,
With *pro* and *con* the learn'd would make it out.
Britons, drink on ! the jolly prelate cries :
What the prelate persuades the doctor denies.
But why need the parties so learnedly fight,
Or choleric Jurin so fiercely indite ?
Sure our senses can tell if the liquor be right.
What agrees with his stomach, and what with his head,
The drinker may feel, though he can't write or read.
Then authority's nothing : the doctors are men :
And *who drinks tar-water will drink it again.*

ON TAR

Hail vulgar juice of never-fading pine !
Cheap as thou art, thy virtues are divine.
To shew them and explain (such is thy store)
There needs much modern and much ancient lore.
While with slow pains we search the healing spell,
Those sparks of life, that in thy balsam dwell,
From lowest earth by gentle steps we rise
Through air, fire, æther to the highest skies.
Things gross and low present truth's sacred clue.
Sense, fancy, reason, intellect pursue
Her winding mazes, and by Nature's laws
From plain effects trace out the mystic cause,
And principles explore, though wrapt in shades,
That spring of life which this great world pervades,
The spirit that moves, the Intellect that guides,
Th' eternal One that o'er the Whole presides.
Go learn'd mechanic, stare with stupid eyes,
Attribute to all figure, weight and size ;
Nor look behind the moving scene to see
What gives each wondrous form its energy.
Vain images possess the sensual mind,
To real agents and true causes blind.

But soon as intellect's bright sun displays
O'er the benighted orb his fulgent rays,
Delusive phantoms fly before the light,
Nature and truth lie open to the sight:
Causes connected with effects supply
A golden chain, whose radiant links on high
Fix'd to the sovereign throne from thence depend
And reach e'en down to tar the nether end.

ON *SIRIS* AND ITS ENEMIES

How can devoted Siris stand
Such dire attacks? The licens'd band
With upcast eyes and visage sad
Proclaim, 'Alas! the world's run mad.
The prelate's book has turned their brains,
To set them right will cost us pains.
His drug too makes our patients sick;
And this doth vex us to the quick.'
And vexed they must be, to be sure,
To find tar-water cannot cure,
But makes men sicker still and sicker,
And fees come thicker still and thicker.
Bursting with pity for mankind,
But to their own advantage blind,
Many a wight, with face of fun'ral,
From mortar, still, and urinal,
Hastes to throw in his scurvy mite
Of spleen, of dulness, and of spite,
To furnish the revolving moons
With pamphlets, epigrams, lampoons,
Against tar-water. You'd know why?
Think who they are, you'll soon descry
What means each angry doleful ditty,
Whether themselves or us they pity.

LETTER ON TAR-WATER

in the *Dublin Journal*
8-12 May 1744

Directions for the Making and Using Tar-water

By the author of *Siris*

To prevent mistakes in the making tar-water, the public is desired to take notice that Norway tar, which is liquid and of a brown colour, is fittest for this purpose. Four quarts of cold water having been poured on a quart of this tar, and strongly stirred together with a flat stick for three or four minutes, must, after it has stood eight and forty hours to settle, be poured off and kept for use either in bottles or other vessels corked up. The same tar will not do well a second time, but may serve for other uses. Water drawn off the tar the second or third time, if long stirred, may be as strong as the first water, but has not that spirit, and is more disagreeable to the stomach.

After various trials I fix on this as a good general rule, which may yet be varied as people have stronger or weaker stomachs. Putting more water or stirring it less makes it weaker, as putting less water or stirring it longer gives it more strength. But it should never be made too strong for the stomach; weaker constitutions require milder medicines. For this everyone's experience is the best guide. It should not be lighter than French or deeper coloured than Spanish white wine. If a spirit be not sensibly perceived on drinking, either the tar was bad or already used, or the tar-water carelessly made. He that would have it good should see it made himself.

Alteratives in general, taken little and often, mix best with the blood. Of tar-water one pint a day may do in chronical cases, drunk on an empty stomach either at two or four doses, to wit, night and morning and two or three hours after dinner or breakfast; but to children it should be given in less quantity. It may be drunk cold or warm, as anyone likes best, but in acute

cases, as fevers of all kinds and pleurisies, it should be drunk warm and in bed, as much and as often as the patient can bear. For instance, half-a-pint or even a whole pint every hour, which will be made easy by the heat and thirst of the patient. I never knew it fail in the most threatening fevers. For outward fomentations or for beasts to drink, it may be made much stronger by infusion of warm water. I am persuaded tar-water may be drunk with great safety and success for the curing of most diseases, particularly all foul cases, ulcers and eruptions, scurvies of all kinds, nervous disorders, inflammatory distempers, decays, etc.

APPENDIX I

To the Author of 'Siris'

An Ode

By the R.R.T.L.B.O.N.[1]

O ! qui caducae sollicitus times
Vitae, benignis usque laboribus
  Fugare praesens imminentes
    Corporibusque animisque pestes;

Musis amicus, leniter audias
Vocem Camoenae, quae sibi reddita
  Jam ludit exultim, lyramque
    Suscitat, impatiens quietis.

Non fabulosis prosiliens jugis,
Et docta labi murmure garrulo,
  Nunc unda me multum loquaces
    Provocat ad numeros volentem;

Sed lympha morbos eluere efficax,
Sed parta dulcis, te medico, salus,
  Sed muneris solantis aegrum
    Conscia mens, modulatur ultro

Carmen. Veternum triste fugit retro,
Fervet renati spiritus ingeni,
  Et sol inassuetum renidens
    Luce diem meliore vestit.

[1] [Prefixed to Berkeley's *Miscellany* (1752). By the Right Rev. the Lord Bishop of Norwich, Dr. Thomas Haytor (1702–62), who held the see 1749–61 and was then translated to London. The ode, in Alcaic stanzas and redolent of Horace, appeared also in *The Gentleman's Magazine* (London), VOL. XXII (1752), p. 472, accompanied by a translation in rhyming couplets. As this retains the hyperbole allowable only in the classical tongue, instead of reproducing it here I have made a somewhat sobered and shortened version in prose.—ED.]

Sed unde fulget largior aetheris
Prospectus ? Ut vidisse juvat sacras
Sedes piorum, quot repertis
Artibus excoluere vitam !

Newtonus illic plurima cogitans,
Viroque carus Boylius it comes,
Et Sydenhamo juncta magni
Hippocratis spatiatur umbra.

Hos tu sequutus, sorte pari doces,
Quae flamma magno corpore misceat
Se rerum, et illabens per artus
Totam agitet foveatque molem.

Hinc suavis halat gratia floribus,
Plantasque radix prodiga parturit ;
Ususque in humanos, per omnem
Nata viret medicina campum.

Sed quanta constat laus, Abies, tibi,
Ligno salubri ! Te positum die
Natura fausto destinavit
Stare decus Borealis orae.

Dilecta silvae filia, turgidis
Seu laeta velis, montis et ardui
Nivale contemnens cacumen
Fluctibus imperiosa surgis ;

Trunco cadenti seu pretium arrogas,
Et praeparato membra dari rogo
Urenda nil moerens, ab ipsis
Ducis opes medicata flammis.

Liquente torrens en ! pice turbidus
Erumpit ; undam rivus agit niger,
Secumque cursu concitato
Fert gravidas oleo favillas.

Mox arboris tu proditor intimae,
Attemperata rite sagax aqua,
Ostendis interpres, liquorum
Quid valeat sociatus amnis;

Queis lympha praegnans particulis micet,
Quae caerulo vis insita poculo,
Imbuta fumis, sedet ignes
Ignea praetereunte succo.

Notam medelam da, puer, ocius
Hoc fonte manans certa fluit salus:
Beatus hinc, uvas nitentes,
Galle, tibi minus invidebo.

Jam, jam aestuantes frigus amabile
Venas pererrat flammaque mox calet
Mollis vicissim, spirituque
Aethereo recreat medullas.

Formas medendi, mille vafer modis,
Tentet latentes chemicus artifex:
Sin arte Naturae, tuaque
Porrigitur medicina simplex.

Cohors recedit torrida febrium;
Recline sensim se caput erigit,
Languore pulso; defluitque
Articulis inimicus humor.

Durare nimbos sic ratis impotens,
Quassata vento, et saucia vermibus,
Secura si, portu occupato,
Induerit piceos amictus;

Relapsa in aequor fert latus arduum,
Fiditque costis nauta tenacibus;
Impune; nec circum furentes
Uncta ratis metuit procellas.

ENGLISH TRANSLATION[1]

Thou who, mindful of our frailty, art always toiling to dispel the plagues of body and of mind, thou who art friend of the Muses, give ear to a Muse that can keep silent no longer and exultant strikes her lyre. 'Tis no stream from fabled hills that moves to song my willing heart, but the Liquor that laves our ills away, and health recovered at thy hands, and gratitude for thy soothing gift; for, my gloomy lethargy gone, my soul seethes with energy reborn, as if the sun, shining with unwonted glory, had clothed the sky with greater light.

Whence this richer prospect? From thy commerce with the spirits of the past, whose arts have life adorned—with Newton of fertile brain, and Boyle, and Sydenham and his mighty master Hippocrates; in whose wake thou followest, telling, as they did, of the Fire that pervades and moves and nurtures the corporeal Whole, that gives the flower its perfume and the root its fertility, and strews the meadows with simples for the use of man.

Chief of these is the salubrious fir, glory of the North, choicest child of the forest, whether with spreading branches it rears its lordly form on snowy peaks, or, felled and burned, it yields from the flames a medicated sap; of which rich stream, when with water duly tempered, thou showest the powers—what substances it holds, and how, though fire-formed, fire it abates. Let the cup-bearer proffer his familiar cordial; but 'tis from that other sap that sure health flows, and, blessed by that, I shall not envy my Gallic friend his gleaming wine, for through my veins it sends now a pleasing coolness, and now a gentle glow reviving the heart. Let the chemist in his thousand ways search after the occult healing essences; but Nature's art and thine supply a simple remedy, with which the fervent troop of fevers is put to flight, the baleful humours are washed away, and the weary head rears itself again. E'en so a ship, battered by rains and winds and worm-eaten, and refuging in harbour, when it has put on a coat of tar braves the sea once more and rides its trusty sides triumphant through the storms.

[1] [See above, p. 229*n*.—Ed.]

APPENDIX II

BOERHAAVE'S 'ELEMENTA CHEMIAE'[1]

The Acid spirit in vegetable oils (cp. *Siris*, Sects. 42, 47, 120f., 136f.):

VOL. I, p. 60[2]: Aestivo calore excoctum oleum plantarum . . . In eo acidus semper adest spiritus, putredinis antidotos.

VOL. I, p. 753: Olea illa praeter aquam adhuc recondunt in se salem quendam subtilem, plerumque acidum, volatilem, ipso fere odore in multis se prodentem . . . Produnt se hi sales forma spirituum acidorum, qui instar aquae se colligunt, ab oleo se separant, nec temere patiuntur postea se iisdem iterum permisceri.

VOL. II, p. 150: Scimus etiam in omnibus his [balsamis] nobis notis aquam, spiritumve, acidum, volatilem, antisepticum, esurinum, penetrabilem inesse, qui plurimum bonae virtutis medicatae fragrantiamque continet. Exhalat facile, tumque relinquit balsamum, privatum hac parte hinc eo respectu ignobilem magis.

VOL. I, pp. 74*f.*: Patet esse in unoquoque singulari animalium vel vegetantium halitum quendam proprium unice illi tantum corpori, adeo subtilem ut odore tantum vel sapore suo aut effectibus sibi tantummodo debitis se manifestet. Exprimit ille vapor sui corporis proprium genium, quo illud imprimis ab aliis omnibus accuratissime distinguitur. Summa quidem hujus tenuitas, qua oculis ulla arte adjutis usurpari abnuit vel manibus capi negat, comitem habet equidem volatilitatem summam; purus igitur solusque ubi fuerit, tum impatiens quietis mobilitate avolat, aurae se immiscet, reditque in commune omnium volatilium corporum chaos. Ibi tamen suae tenax naturae volitat donec cum nive, grandine, pluvia, rore in terram deciduus humor, hujus se iterum gremio infundat hocque foecunda sua foetura impraegnet, cum humoribus deinde illius in succos denuo animalium et vegetantium inolescat, talique revolutione in nova redeat, quorum agitet molem regatque, corpora. A mobili penetrabilitate, subtilitate exquisitissima, volatilitate efficacissima

[1] See above, p. 11. [2] The references are to Boerhaave's own 1732 edition (2 vols., 4to Leyden).

veteres Alchemistae, summi sane artis magistri rerumque physicarum consummatissimi exploratores, liquorem hunc Spiritum Rectorem appellavere. Suo ut corpori insitus maneret hic, innexuit illum Deus tenaci, constanti, nec aëre vel aqua nec igni naturali facile difflando oleo.

VOL. I, p. 63 : Spiritus Rector—oleum princeps hujus spiritus vera sedes.

VOL. I, p. 756 : Cuncta haec oleorum genera, quaecunque demum fuerint, aliquid adhuc tenue, volatile possident, quod iis inhaeret, sed inde tamen potest excuti. Spiritus scilicet Rector vel Archaeus jam supra descriptus. Est ille agilis, odoratus, sapidus, ignis filius. Qui effectuum incredibilium vera causa. Ille igitur oleis innatus, in iis retentus et ligatus, illa imbuit virtute singulari, satis efficaci neque alibi invenienda. At postquam penitus evanuit ex his oleis relinquit eadem inertiora longe neque fere magis inter se distincta.

Distinction of elemental and common fire (cp. *Siris*, Sect. 190):

VOL. I, pp. 283f : Huc usque conabar . . . tradere ea quae verissima addiscere potui de natura illius ignis quem elementalem appellant philosophi . . . Operam dedi gnaviter ut hanc prius cognitionem traderem quam accederem ad speculandum ignem qui materia combustili dicta vulgo sustentatus, longe alius a praecedenti habetur atque effectis quoque suis inde quam maxime differt. Enimvero errores plurimi orti fuere in Chemicis inde quod artifices satis caste haud distinguerent inter has duas rerum species, quas omnes uno vocabulo ignem dixerunt. Agite ergo, transeamus jam ad ignem vulgarem excutiendum, quem multi solum ignem esse putant

Elemental fire everywhere present (cp. *Siris*, Sects. 152, 200):

VOL. I, p. 127 : Ipsa ignis elementa ubique, et in corpore solidissimo auri et in vacuo maxime inani Torricelliano, habitant, omniaque corpora et spatia aequali distributione et insinuatione obsident.

VOL. I , p. 187 : Ipse ignis hactenus nobis innotescens semper praesens existit in omni loco, licet non semper ibi nobis detegatur vulgariter ignis praesentiam indagantibus.

Elemental fire a universal cause (cp. *Siris*, Sects. 149, 158):

VOL. I, p. 126 : Si tamen mirabilis est ignis, in eo sane praecipuum admirabilitatis constituendum videtur quod omnium

fere effectuum sensibus nostris capiendorum autor princeps et causa, ipse tamen sensu percipiatur nullo, sed subtilitate incomprehensibili ita indaginem eludat sagacissimi ut et ab aliis pro spiritu verius quam pro corpore sit agnitus.

VOL. I, p. 175: Ignem appellabo illam rem, incognitam caeterum, quae istam in se proprietatem habet ut corpora omnia consistentia et fluentia penetret atque eo ipso eadem dilatet in spatia majora.

VOL. I, p. 190: Possent omnia corpora, quae infinitissime et absolutissime agens omnia Deus creavit locata in spatio immenso, dividi in ignem expandentem omnia reliqua corpora, et in caetera universa corpora quae non sunt ignis semper contranitentia separationi suae monadis. Inde adeo duo haec principia, expandens unum alterum associans, inprimis per omnia dominari, plurimarum actionum corporearum causas esse.

Elemental fire naturally ingenerable and incorruptible (cp. *Siris*, Sects. 174, 176, 198):

VOL. I, p. 203: Quare nulla veri simili specie cogitari possit hunc ignem assiduo gigni, natum vero semel manere semper copia eundem . . . Non enim difficilior haec migratio ignis quam ullius alterius fluidi intelligitur.

VOL. I, p. 252: Credibile videtur in actione ignis, hic apud nos deprehensa, nulla Solem emittere materiem igneam cui illa actio tribuenda videtur.

VOL. I, p. 354: Non constitit nobis quod ulla res quae commissa igni elementali in eum ipsum transierit . . . Quare asserere non audeo alcohol, olea aut ulla alia corpora ignem fieri in combustione.

VOL. I, p. 401: Ille [ignis elementalis] enim motor universalis videtur a quo caetera motum suum accipiant, fluida sane omnia, forte et solida quam plurima; qui neque nascitur neque recreatur neque resuscitatur unquam, sed quidem ex occulto manifestus redditur.

VOL. I, p. 126: Chemicorum vero quidam pro re non creata suspiciebant postquam ejus virtutem explorassent.

VOL. I, pp. 185f.: Miratus sum quum legerem antiquos Hermeticos retulisse nobis in suis scriptis quod in igne puro summum sit silentium, quies absoluta, atque in illo habitare Deum, unde tamen emissi ignes ministri moribunda per inertiam corpora vivificarent, moverent . . .

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